Engineering News, November 9, 1961

a tool for every task!

CEMENTED CARBIDE CUTTING TOOLS
Manufactured by WICKMAN LIMITED COVENTRY

No. 6 November 9, 1961

ENGINEERING NEWS

THE NEWSPAPER OF INDUSTRY • A HEYWOOD PUBLICATION

Registered at the G.P.O as a newspaper

Trims mild steel, cast iron, hard plastics, gun-metal, etc
INDUSTRIAL TOOL with the New 'Blue' Blade by SURFORM
Blade an invention of Firth Brown Tools Ltd.

Every Thursday, Price 4d

Prominent engineers to attend conference

MONDAY: DESIGNERS TO DISCUSS NEW MATERIALS

Swedish delegate to report on composite structures

TRADITIONAL materials such as steel castings and unusual engineering materials such as graphite are among the very wide range of subjects to be discussed at the Second Engineering Materials and Design Conference, starting at Earls Court, London, on Monday.

Aimed at engineering designers this conference will also interest many other engineers who must keep up to date with the latest developments in engineering materials.

The increasing use of liquid gases and the dangers of catastrophic failure of engineering equipment at the very low temperatures involved, bring special interest to the paper by E. T. Gill — "Steels for the design of low temperature equipment."

Effects of low temperatures

The effect of low temperatures on mechanical properties and the importance of steel composition are of great interest to engineers faced with this problem.

A modern trend in engineering design is the use of composite structures (sandwich construction) in which materials of different composition and physical form are combined to provide properties hitherto unobtainable, and properties better than those of the individual materials on their own.

This is the subject of a paper by B. R. Noton, of the Aeronautical Research Institute of Sweden.

Among the prominent engineers who are supporting the conference as chairman of the daily sessions are:

Admiral R. S. Hawkins, director of marine engineering, the Admiralty; Dr. H. G. Taylor, director, Electrical Research Association; C. H. Flursheim, director, A.E.I. (Manchester); W. L. Mather, director, Mather and Platt.

Sir Sydney Camm, director, Hawker Aircraft; A. E. Crook, chief engineer (production), National Coal Board; Dr. H. M. Finniston, Deputy Research Director, C. A. Parsons & Co.: D. W. Morphy, director, Morphy-Richards (Cray); Dr. R. Hunter, Deputy Managing Director, The Clyde Alloy Steel Co.

More details of the conference and exhibition are given on pages four and five.

In this issue

Plastics
by Dr. C. L. Child 9
Tea break
by J. L. Henderson 17
Common Market
by J. D. F. Perry 8

DEPARTMENTS

Letters 2
People in the News 2
American Letter 6
New Patents 6
Foreign News 12
New Products 13, 14
Finance & Commerce ... 15, 16
Classifieds 18, 19

SIR ERNEST SAYS . . .

ALTHOUGH retired for some time, I welcome Engineering News because it impresses me as being a quite excellent medium for "keeping in touch".

I hope that very many will have the opportunity to benefit similarly. A year's subscription would be a nice little Christmas present for a retired engineering friend.

SIR ERNEST FIELD CBE, JP, M.I. Mech. E. Glasgow, W.3

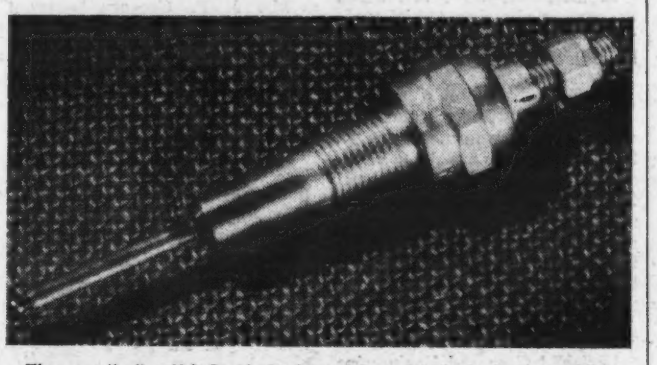
TWENTY TORQUE UNITS —FREE!

TWENTY three-stage hydraulic torque converters are to be offered by Twin Disc to engineering departments of universities and technical colleges in the U.K. The units will transmit 300 h.p. at an input speed of 2,100 r.p.m., but they are equally suitable for power ratings of 5 h.p. upwards at very low input speeds. The characteristics of the converters do not alter with changes in speed or power transmitted.

Applications invited

In the event of more than 20 applications being received for the units, which will be supplied free of charge apart from transport and installation costs, the Editor of Engineering News has agreed to select, in conjunction with Twin Disc, the 20 establishments who in their opinion will make the best use of them. Correspondence from universities or technical colleges who would like to take advantage of this offer should be addressed to the Editor.

The converters have been manufactured by Rolls-Royce under licence from the Twin Disc Clutch Co. of Racine, Wisconcin.



The pencil-slim K.L.G. glow plug with a sheathed element which is only a third of the diameter of that of the conventional exposed coil—1/8in. compared with 3/8 in.

The pencil plug

BMC INTRODUCE AEI UNIT ON 1.5 LITRE DIESEL CAR AT TOMORROW'S GLASGOW SHOW

A NEW 1.5 litre diesel engine —which incorporates a pencil-slim glow plug of entirely new design—has been announced by the British Motor Corporation.

It will be shown for the first time at the Scottish Motor Show which opens tomorrow at Kelvin Hall, Glasgow.

Already in production, it is derived from the "B" series petrol engine and shares many component parts, including crankcase and cylinders, rocker cover, backplate and several accessories.

B.M.C. claim that this standardisation between petrol and diesel has enabled them to keep down the price of the new diesel to no more than £85 over that of the petrol engine.

Another important factor is the retention in the diesel of the standard engine cylinders and dimensions.

A stronger, more massive crankshaft with shorter but high load-

● back page, column 6

4-year plan costs £4½m.

A £4,500,000 SCHEME for modernising production facilities for plates and wide sheets has been announced by Firth-Vickers Stainless Steels, of Sheffield. It will take three to four years to complete.

In the first stage, obsolete mills will be replaced by a new 80in.-wide hot reversing mill, fully mechanised to produce plates up to 6ft. finished width, and from 0.187in to 1in. thick.

Some sheets will be further reduced in thickness by cold rolling.

Widespread uses

The new plant is to be erected at Shepcote Lane. Then facilities for cold rolling and final processing of wide sheets at the company's Staybrite Works will be reorganised to increase handling capacity from 48in. to 72in.

Stainless steel has widespread uses and is particularly important to the aircraft industry. It made possible the first jet engine pioneered by Sir Frank Whittle over 20 years ago. It was the only material that would stand up to stresses and temperatures imposed.

About 90 per cent of the latest Bristol supersonic experimental aircraft (the T188) is made of Firth-Vickers stainless steel, to allow it to withstand the temperatures generated by the "heat barrier".

CATERPILLAR HAUL-OFF MACHINE

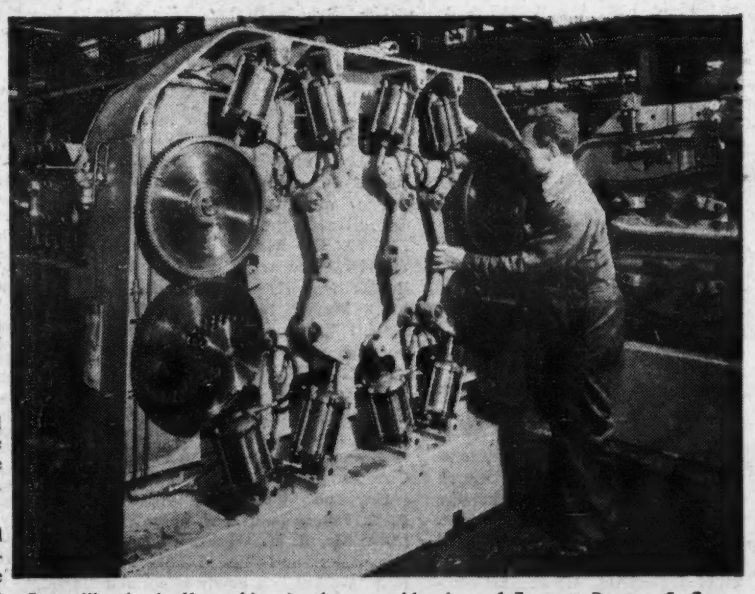
HAULING-OFF rubber- and plastic-covered cable from extrusion equipment by means of two opposed caterpillar tracks is the basis of a machine produced by Fawcett Preston & Co., of Bromborough, Cheshire.

The tracks consist of chain-mounted, replaceable rubber pads driven through an infinitely variable speed unit with a maximum line speed of 500ft. per minute.

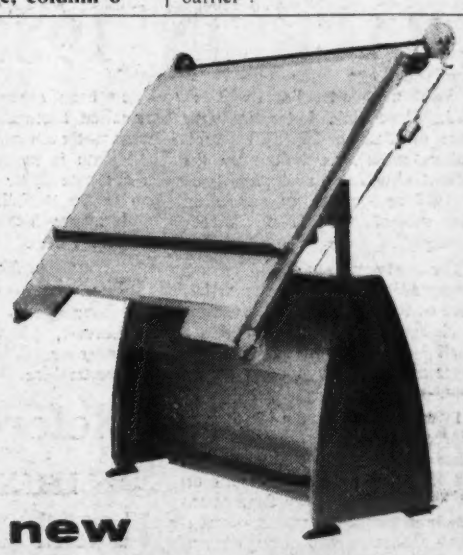
SIZE RANGE

They can exert a pull of 5,000lb. and can be adjusted to haul cable from 0.312in. to 5in. diameter.

Air cylinders control four shoes which automatically compensate the tracks against variation of cable diameter.



Caterpillar haul-off machine in the assembly shop of Fawcett Preston & Co., Bromborough, Cheshire.

A HALL HARDING ENGINEERING PRODUCT

the new CAVENDISH drawing stand
Free standing. Fully adjustable. New height adjustment mechanism eliminates heavy balance weights. For Double elephant, Antiquarian or Hamburg boards. Accommodates any type of drafting machine.
Further details and full catalogue of Drawing Office Equipment from—
HALL HARDING LTD
Stourton House, Dacre Street, London, S.W.1. Telephone ABBey 7890

MR. CROCKETT IS U.K.'S FOREMOST MASTER PATTERN MAKER

THE Birmingham and Manchester firm of Wright and Platt Ltd. has been taken over by a former employee, who now becomes managing director.

He is Mr. W. J. Crockett, chairman and managing director of Crockett Lowe Ltd., Robinson and Knee Ltd. and C. L. Developements Ltd., the Birmingham firms of engineering pattern makers.

MR. W. J. CROCKETT

This latest acquisition to the Crockett Lowe Group of Nuclear House, Birmingham, consolidates Mr. Crockett's position as Britain's foremost master pattern maker.

☆

Mr. A. Jackson, technical adviser on steelmaking to United Steel, **Mr. T. G. Marple,** general manager of Barrow Steel Works, and **Mr. E. T. Sara,** assistant general sales manager of United Steel, have been appointed directors of Barrow Steel Works.

Mr. A. J. Peech, deputy chairman and general managing director of United Steel, remains a director.

Sir Walter Benton Jones, chairman of United Steel, and **Mr. L. Highton,** have resigned from the Barrow board

☆

Two new directors have been appointed to the board of Stanley Works (G.B.) Ltd., the tool manufacturers.

Mr. A. G. Jones, general works manager has been appointed works director and **Mr. W. R. Mills,** general sales manager, has been appointed sales director.

Mr. W. M. Dingley has relinquished his seat on the board in view of his increasing commitments as director of marketing in Europe for the whole of the Stanley organisation.

☆

Mr. G. N. Leach has been appointed chief engineer, Power Transformers (Rugby), in the Transformer Division Associated Electrical Industries Ltd.

After serving a graduate apprenticeship at the British Thomson-Houston Company's Rugby Works, he became an engineer in 1937 in the Transformer Engineering department.

In December 1959, Mr. Leech was appointed assistant chief engineer, Transformer Engineering Department, Rugby.

☆

Mr. N. F. Parker, managing director of Stewart and Gray Ltd., London, has been appointed chairman of the Vitreous Enamel Development Council, in succession to **Mr. S. W. Vickery,** managing director of Ferro Enamels Ltd., who has resigned, but will continue as a director of the Council.

☆

Highfield Gear and Engineering Co. Ltd., have appointed as chairman of the company **Mr. J. T. Schofield,** who for the past three years has been managing director of the company. He succeeds the late Mr. G. W. Smith.

☆

Brigadier J. Clemow, formerly chief engineer, Weapons, and a special director of Vickers Armstrongs (Aircraft) Ltd., has been appointed engineering director of G.C.E. (Electronics) Ltd.

PEOPLE in the NEWS

From 1948 Brigadier Clemow worked at R.A.E. Farnborough until he became, in 1951, assistant director, Guided Weapons Projects, at the Ministry of Supply headquarters.

In 1953 he was lent to the

BRIGADIER J. CLEMOW

Fairey Aviation Company as head of its Guided Weapons team, but returned to the Ministry of Supply as director of Guided Weapons Projects in 1955.

☆

Mr. J. P. Gregory, assistant manager at Rugby of the Control Gear Engineering Department, AEI Motor and Control Gear Division, died on October 31.

On completion of a student apprenticeship with British Thomson-Houston company Mr. Gregory joined the Control Gear Engineering department where he specialised on industrial contactor control. He was appointed assistant manager, Rugby, Control Gear Engineering Department AEI Motor and Control Gear Division in 1959. Mr. Gregory was forty-seven.

☆

Mr. H. Stone has been appointed works manager of Markham and Co. Ltd., Chesterfield. He has been with the company for 39 years and has held the appointments of assistant works manager, production manager and quality control engineer.

Other appointments by the company are **Mr. F. Cherry** as quality control engineer; **Mr. J. Bateman** as chief designer, and **Mr. M. G. Bennett** as deputy chief designer.

☆

The death occurred on 25 October at the age of 72 of **Mr. W. Tagg,** prior to his retirement in 1957 for 35 years a traveller with Rylands Works Ltd., Chesterfield, by whom he was employed for 50 years.

☆

Celotex Ltd. have announced the election of **Mr. R. C. G. Clarke** as a director of the company.

☆

Mr. V. Stott, managing director of James Stott and Co. (Engineers) Ltd., the Oldham catering equipment manufacturers, has been appointed to the board of Glover and Main Ltd., the parent company.

☆

Mr. F. Kenyon, a senior director of William Kenyon and Sons Ltd., engineers, Dukinfield (Cheshire) has been appointed chairman of the Federation of European Petroleum Equipment Manufacturers for a period of two years.

☆

Mr. P. B. Wood has been appointed chief accountant in the Treasurer's department of Associated Electrical Industries Ltd. Mr. Wood joins AEI from Crompton Parkinson Ltd.

After leaving the army in 1948, he qualified as a chartered accountant in 1951 and joined Joseph Lucas (Industries) Ltd. in the Organisation Control department. The following year he transferred to a subsidiary, Rotax Ltd., as chief accountant. He became company secretary in 1955. Mr. Wood joined Crompton Parkinson Ltd., as comptroller in 1958.

☆

Mr. J. G. M. Hart, the manager of the Mining and Metallurgical Agency's iron ore department for the past seven years, has left to join the iron ore procurement division of B.I.S.C. (Ore).

☆

W. C. Holmes and Co., the Huddersfield engineers announce that **Mr. F. B. Holmes,** chairman and managing director, has retired as managing director.

Mr. Holmes joined the company in 1922 and became a member of the board of directors in 1923. He will retain his position as chairman of the company, of the holding company, BHD Engineers Ltd., and of those companies of which he is at present chairman.

Mr. A. J. M. Henshaw succeeds Mr. Holmes as managing director. Mr. Henshaw joined the company in 1946 and was appointed to the board of directors in 1953. In 1960 he became assistant managing director. **Dr. W. T. Cosby** has been appointed to the board.

☆

Mr. D. G. Booth, has been appointed as divisional general manager of The Plessey Company's Industrial Hydraulic Division at Cheney Manor, Swindon.

Included in this division is a new production unit which will be manufacturing the Hydro-Stabil range of equipment follow-

MR. D. G. BOOTH

ing the licence agreement concluded by Plessey with Guldner-Motoren-Werke last April. Mr. Booth was associated with this division at its inception and he now returns to it after spending the last two years as engineering executive of the Plessey Swindon Region.

He is also director of Plessey Maschinen Elemente G.m.b.H. of Dusseldorf, W. Germany, which is a wholly owned subsidiary of the Plessey Co. Ltd. and markets the full range of Plessey hydraulic equipment.

☆

Henry Wiggin and Co. announce that **Mr. R. E. Ansell** will assume the title of sales director and **Mr. C. Bowles** will be appointed to the position of sales manager, responsible to the sales director. These positions become effective as from 1st November.

☆

The British Valve Manufacturers' Association announce that **Mr. A. Robertson,** managing director, Glenfield & Kennedy Ltd., has been elected chairman for the year 1961/62. **Mr. F. Burgess,** managing director, Whites-Nunan Ltd. has been elected vice-chairman.

The other members of the Executive Committee for the year 1961/62 are: **Mr. D. Bailey** (Sir W. H. Bailey and Co. Ltd.), **Mr. B. S. Bass** (Dewrance and Co. Ltd.), **Mr. D. S. Birkett** (Samuel Birkett Ltd.), **Mr. W. R. Blakeborough** (J. Blakeborough and Sons Ltd.), **Mr. F. S. Ham** (Ham, Baker and Co. Ltd.), **Mr. H. R. Hammond** (Crane Ltd.), **Mr. K. M. Leach** (Audco Ltd.), **Mr. N. P. Newman** (Newman, Hender and Co. Ltd.), **Mr. T. B. Pattison** (Alley and MacLellan Ltd.), **Mr. A. L. Trump** (Saunders Valve Co. Ltd.), **Mr. R. F. Walker** (Walker, Crosweller and Co. Ltd.). Mr. R. F. Walker is a newly appointed member of the committee.

Mr. E. K. Cole has resigned from the boards of British Electronic Industries and its subsidiary, E. K. Cole, Ltd.

Mr. Cole was deputy chairman of B.E.I., the television, radio and electronics group formed last year by the merger of the Pye and Ekco Groups. He founded the

MR. E. K. COLE

Ekco radio receiver manufacturing business in 1922 and at the time of the formation of B.E.I. Mr. Cole was chairman and managing director of E. K. Cole, Ltd. **Mr. C. O. Stanley,** chairman of B.E.I. said that Mr. Cole decided to resign after having differences of opinion with his colleagues on the board over two or three matters.

☆

Efco Furnaces Ltd. announce that **Mr. C. J. Evans** has been appointed area sales manager. Mr. Evans, at present sales manager of the furnace department of the General Electrical Co. Ltd., will take up his new appointment on December 1.

Mr. T. E. Peacock and **Mr. A. C. Nicholson,** joint managing directors of Laporte Acids Ltd., have been appointed directors of James Wilkinson and Son Ltd., the Laporte Group company specialising in aqueous hydrofloric acid and inorganic compounds.

Mr. Nicholson has also been appointed a director of the Sheffield Chemical Co., the other Laporte Industries manufacturing company in Yorkshire.

☆

Mr. J. Hill has been appointed secretary of Laporte Acids Ltd., James Wilkinson and Son Ltd. and the Sheffield Chemical Co. He is also accountancy manager of these companies.

☆

Mr. C. Toyer has accepted an appointment to the London office staff of Drysdale and Co. Yoker, Glasgow. Mr. Toyer took up his new post as marine sales manager in London on November 6.

☆

Mr. D. F. Pexton, marketing director of the South Western Division of the National Coal Board, is to retire on health grounds. His successor will be announced later.

At the beginning of 1947, when the coal industry was transferred to public ownership, Mr. Pexton joined the East Midlands Division of the NCB. He became marketing director of the South Western Division in 1958 and in the following year was appointed to a three-year term on the Transport Users' Consultative Committee for Wales and Monmouthshire.

☆

Tecalemit Ltd. announces the appointment of **Mr. N. J. Bennett** as special overseas representative of the board. He will be making extended tours of overseas countries beginning with India and Australia to discuss with Tecalemit subsidiary companies boards and officials current conditions and future policy.

Mr. Bennett will continue to hold his present post as managing director of British Filters Ltd.

☆

Associated Electrical Industries Ltd. announce two new appointments in the Heavy Plant Division. **Mr. J. A. Garrod** becomes engineer-in-charge, Control Equip-

MR. J. A. GARROD

ments, Plant Applications Engineering Department, and **Mr. G. H. Sutton** commercial engineer-in-charge, Rolling Mills, Large Electrical Machine Sales.

After completing his apprenticeship, Mr. Garrod joined the staff of the company's Industrial Control Engineering Department as an engineer. On divisionalisation of AEI in 1959 he transferred to Heavy Plant Division as Section Engineer, which position he has held until his present appointment.

Mr. Sutton joined the British Thomson-Houston company in 1939 as an engineering apprentice and after obtaining his Diploma in mechanical engineering in 1943 he served with the Royal Navy.

On leaving the Navy in 1946,

MR. G. H. SUTTON

Mr. Sutton returned to BTH at Rugby to continue his apprenticeship, and three years later he joined the staff of the company's Plant Sales Department. Since 1953 he has been concerned with electrical equipment for rolling mills and has dealt with many of the large contracts executed by AEI

Letters to the Editor

I FORESAW THIS BACK IN 1938...

I WAS most interested in Mr. P. J. Mosedale's letter in your issue of October 26, 1961 (Toolmakers unite), as I foresaw the present situation developing back in 1938 and wrote an article on this subject for "The Factory Manager".

The circumstances which prompted me to write the article were as follows. I was at the time in charge of what in effect was a small experimental engineering department, within a large manufacturing concern.

I was continually being approached by toolmakers (and other craftsmen) in the concern to ask if I could take their sons on the staff section of my department which employed a number of technical assistants and draughtsmen.

All these parents were unanimous about one point—**they were not going to allow their sons to follow in their own trade.** I might add that the sons were equally agreed on this.

This represented a marked change from the situation pre-1914 when it was traditional for the son of a craftsman to follow in the father's trade.

In the article I recommended what in fact Mr. Mosedale is now suggesting, namely, a privileged status for toolmakers and designers. I think this is a matter of vital urgency.

In the latter few years I have often been compelled to employ so-called toolmakers, who in fact were not even competent fitters.

If one is lucky enough to find a first-rate man, unless he is put on to the staff, it is often impossible to pay him enough to attract or retain him.

A. M. HALLAWELL, B.Sc., A.M.I.E.E.
448 Birmingham Road,
Marlbrook,
Bromsgrove,
Worcestershire.

References mixed!

IT seems that W. J. Minton has mixed his terms of reference (October 26 issue).

An increase of 100 per cent = an **extra** amount equivalent to the original amount.

An **output** increased by 100 per cent = a doubled **output.**

An increase of 300 per cent = an extra amount equivalent to three times the original. (In terms of output = four times the original output.)

I sincerely hope that no other A.M.I.E.E. will be so confused—or we shall all be short-circuited!

M. C. HALL
59 Avondale Avenue,
Finchley,
London, N.12.

Coming EVENTS

THIS WEEK

November 3-13
International Laundry, Dyeing and Allied Trades Exhibition. Paris.

November 7-12
Convention on Automation and Instrumentation. Milan.

November 8-14
International Dairy Equipment Exhibition Paris.

November 10-18
Scottish Motor Show. Kelvin Hall, Glasgow.

November 13-16
National Maintenance Conference and Exhibition. Central Hall, London.

November 13-16
Seventh Annual Conference on Magnetism and Magnetic Materials. Phoenix, Arizona.

November 13-18
Engineering Materials and Design Exhibition. Earls Court, London. Factory Equipment Exhibition. Earls Court, London.

November 15-17
British Iron and Steel Federation Training Conference. Old Swan Hotel, Harrogate.

November 15-29
Building Exhibition Olympia, London

November 16-19
Conference, Scientific Instruments Manufacturers' Association. Grand Hotel, Eastbourne.

November 23
One-day Conference of the British Institute of Management on Efficiency in the Office. Connaught Rooms, London, W.C.1.

November 27-December 1
Fifth Congress and International Automation Exposition. New York.

January 3-13, 1962
Eighth National Boat Show. Earls Court, London.

January 8-12, 1962
International Heat Transfer Conference. Institution of Mechanical Engineers, Westminster, London.

January 9-11
Eighth National Symposium on Reliability and Quality Control. Washington, D.C.

January 22-25
National Plant Maintenance and Engineering Show. Philadelphia.

January 29-February 2, 1962
Electrical Exposition. New York.

April 5-8
Fifth Annual British Motor Show. Queen Elizabeth Hotel, Montreal.

ECONOMIC AXE FALLS ON TRAINING CENTRES

BY OUR OWN PARLIAMENTARY CORRESPONDENT

MR. JOHN HARE, Minister of Labour, assured M.P.s in the Commons last week that he had no intention of cutting down Government training centres where there was a demand for them.

But in the interests of economy he was reducing the provision in next year's estimates, both in staff and money, to no more than was sufficient to meet demand for these services, which had recently been running below the provision made.

He was considering closure of two Government training centres which were not being fully used. None of the first year apprenticeship classes would be closed.

* * *

Conservative M.P. Commander Anthony Courtney (Harrow, E.), will question the President of the Board of Trade, Mr. Frederick Erroll, on November 21 about the sterling outgoings in the last three years from the manufacture in this country of foreign designed direct-coupled marine diesel engines over 5,000 horse-power.

He wants to know the extent of capital payments in consideration of the acquisition of licences, royalties on engines manufactured and fees in other forms, such as the renewal and extension of existing licences.

'INDUSTRY NEEDS A LEADER'

Fighting speech by I.Prod.E. president

"INCREASED productivity is the key to our economic difficulties, and it is time the Government paid more than lip service to this idea. A Minister of Production should be appointed, and he must be an industrialist, not a politician."

Mr. Harold Burke, president of the Institution of Production Engineers, made what many of his listeners considered a "fighting speech" at the annual dinner in London last Wednesday.

He mentioned British Railways, where a top-ranking industrialist has been called in to take charge of reorganisation, and pointed out how much more important it is that industry should have at its head the most talented industrialist it is possible to find.

Training facilities

One field in which the Government should act now, he said, is in education for management. There must be better facilities for training potential top managers, and degree courses in production engineering should be established at universities and Colleges of Advanced Technology.

The production engineer cannot be just a small tooth in a large cog and it must be recognised that the science of manufacture is a highly important function.

There are now some 13,000 qualified members of the Institution of Production Engineers, and every day each one of them takes decisions which affect the economic future of the country.

Mr. Burke, who is deputy chairman and joint managing director of Concentric Ltd., also appeals for greater co-operation between the senior institutions; teamwork was necessary to effect the improvements in industry which are so badly needed.

A speech, both penetrating and humourous, was given by the guest of honour, Lord Chandos, who replied to the toast of "the Guests".

As one who had been an M.P. from 1940 to 1954, and a member of the Government for several periods, he had some pungent remarks to make on Mr. Burke's low opinion of politicians.

But he agreed with the importance of education for management.

He also emphasised that the benefits of increased productivity cannot all be passed on to the worker, for they are basically due to capital expenditure and skilful management. An increase in productivity brought about by the installation of a computer, for example, owes almost nothing to labour.

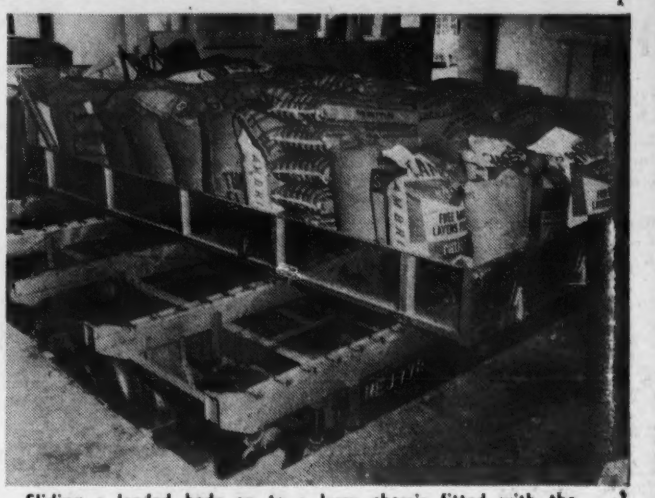
ROLLER SPEEDS LOADING

SPECTACULAR savings in loading and unloading times for vans and lorries have been achieved by the installation of Rolamat conveyers, and one of the most ingenious applications of the system to date was evolved by the Welsh Agricultural Organisation Society.

They have fitted the roller tracks to a number of 4-ton lorries and provided each lorry with two separate bodies.

Similar tracks are embedded in the loading bay serving the vehicles so that instead of a lorry being out of action while it is loaded, an empty body is rolled off and replaced by a loaded one, resulting in the turn-round period for vehicles being cut by nine-tenths.

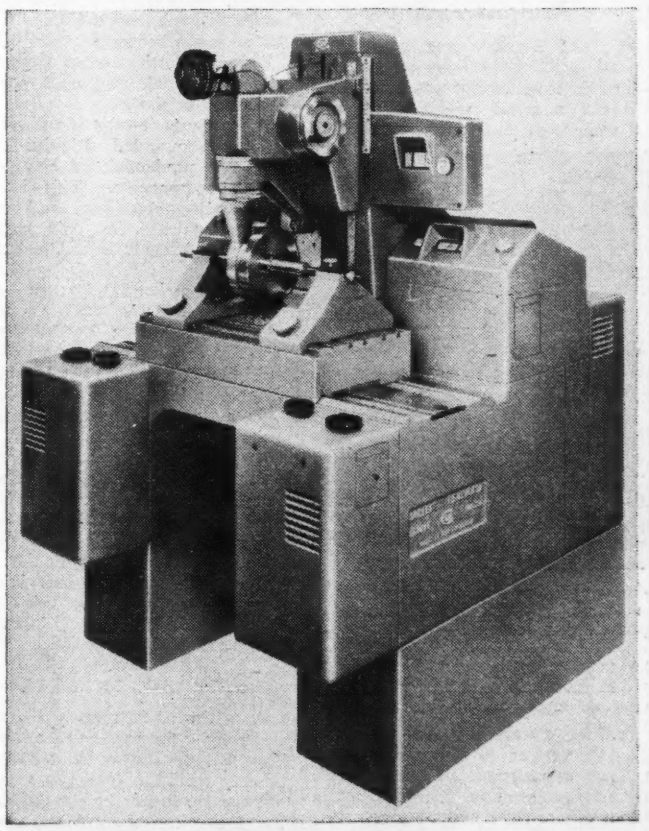
Rolamat is manufactured by Armstrong Whitworth Equipment of Hucclecote, Gloucester, and was originally developed for the handling of heavy, palletised loads in cargo aircraft.



Sliding a loaded body on to a lorry chassis fitted with the Rolamat conveyor system.

Two basic types are available: Mark I, has rollers of linen-reinforced Bakelite and Mark II, has light alloy rollers fitted with needle roller bearings.

PRECISION MEASURING MACHINE ON SHOW



A SMALL exhibition of precision measuring equipment and apparatus opens today in London, among which is a new measuring machine by Societe Genevoise.

This is a precision three co-ordinate universal measuring machine for component parts in small batches or for the first off in a series.

The accuracy of jigs, fixtures and tools can be checked, including cases where roundness and concentricity must be related precisely to other features.

A prototype of a mechanical pen for the accurate drawing of instrument scales to an accuracy of 0.001in. between any two graduations is being shown by Taylor Hobson.

The two firms will show their products at the Mayfair Rooms, Bryanston Street, W.1, up to November 17.

Formula for Problems? An ELLIOTT Computer!

Computer Exhibition Olympia
Oct 3-12 1961 Stand Number 14

COMPUTING DIVISION, ELLIOTT BROTHERS (LONDON) LIMITED, BOREHAMWOOD, HERTFORDSHIRE, ENGLAND.
A member of the Elliott-Automation group

Easy-to-view layout gives new look to ninth factory equipment show

MORE than 350 firms will be displaying plant and equipment, designed to increase efficiency in the factory, at the ninth International Factory Equipment Exhibition opening in London on Monday, November 13.

This year's exhibition will occupy both floors at Earls Court, covering an area of 375,000 sq. ft. It closes on Saturday, November 18. Opening ceremony will be performed by Dr. Richard Beeching, chairman of the British Transport Commission.

There will be a number of new features in the presentation of the exhibition. The organisers have grouped the exhibits into 14 sections, each corresponding to a major division of industry.

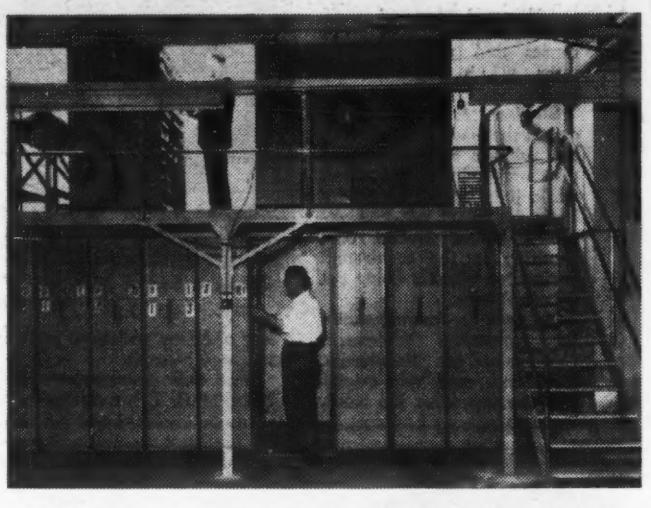
There are separate sections, for example, for safety, security and fire protection; industrial finishes

Relying on suction to pick up both litter and dust, the petrol-driven Littervac requires little maintenance.

and anti-corrosives; workshop machines, tools and equipment; and power transmission, hydraulics and pneumatics.

To allow the many examples of protective clothing and personal safety equipment to be seen to advantage, there will be "fashion" parades three times daily professional models and specialist commentaries.

In the handling, storage and partitioning section, one stand certain to receive close attention is that of Acrow (Engineers), who are showing their new Compacrow mobile storage system, designed to make the best possible use of limited storage space.



Mobile storage bin systems developed by Acrow (Engineers) to allow most of the space normally taken by gangways to be used.

It is claimed to be equally efficient for small offices as for large component or tool stores.

Storage units, usually of double-sided steel shelving, are mounted on steel-framed bases running on rails fixed to or built into the floor.

Each unit requires only finger-tip pressure to move it, and the shelves can be closed together and locked at night.

The system gives the same access facilities as the normal rows of shelving to be found in stores but with the almost complete elimination of gangway space.

Ultra-sonic sensing and switching equipment which has not previously been shown in this country will be on the stand of Westool.

The Sonac system, as it is called, relies on a beam of ultra-sonic energy between two sensing units to detect the presence of liquids, solids, ferrous or non-ferrous metals, oqaque or transparent materials.

A control unit is required, consisting of a power supply, output relay and transistorised amplifier, and power consumption is approximately 1 watt.

Equipment of this type can be used for automatic weighing, size control, filling, door operation, machine guards, level indication, and many of the applications for which photo-electric cells are used.

The advantage of the ultra-sonic system is that it is unaffected by dust or contamination in the atmosphere, changes in light level, or vibration.

Television cameras

Industrial closed-circuit television will be the subject of several exhibits, and Rank Precision Industries will be showing a number of cameras including the Dage 63-A, said to be the cheapest of its class available in this country.

It is completely self-contained, requiring only connection to the mains, and it is designed for indoor and outdoor work.

A single coaxial cable runs from the camera to the monitor.

Another Rank camera on display, the 70-BR, can adjust itself automatically to wide variations in light level. It is particularly suitable for security applications requiring both day- and night-time operation.

Automatic cafeteria

There will be at least two automatic cafeterias in the conteen, welfare and automatic vending section and Automat say their unit can supply a full four-course meal to satisfy the most discerning palate.

Automatic shops for factory workers will also be featured and the Automatic Canteen Co. (Great Britain) have a new machine for which there has long been a need — an automatic £1 note changer.

A rotary oil burner with modulating pre-combustion chamber, claimed to be the only burner with infinitely variable oil and air control, giving a constant air speed at all loads, is to be shown by Hartmann Engineering of Copenhagen.

This burner produces a constant carbon dioxide percentage over its entire regulating range, promising maximum fuel economy and practically soot-free combustion.

Two conferences, organised by the British Productivity Council, will take place while the exhibition is in progress. They are Efficiency in Today's Factory, and Producing for European Markets.

the finest **protection** of all

gold hard and bright
always reliable
large quantities-lower cost

silver soft or hard
dull or bright
low contact resistance

and most successfully applied by

PRECIOUS METAL DEPOSITORS LTD, Broad Lane, Coventry. Tile Hill 66691/2

See us on **STAND E16** *at The Engineering Materials & Design Exhibition—Earls Court, November 13-18.*

Wider applications

Latest in materials and design techniques

SOME of the most prominent names in industry will be among the exhibitors at the second Engineering Materials and Design Exhibition, which opens at Earls Court on Monday.

About 100 firms will be showing the latest design applications of new materials in all branches of engineering.

A conference for engineering designers will be held throughout the week in the adjoining Conference Theatre.

One of the new specialised processes now widely adopted by industry is the use of self-lubricating bearings, filter elements, and structural parts manufactured by powder metallurgy techniques.

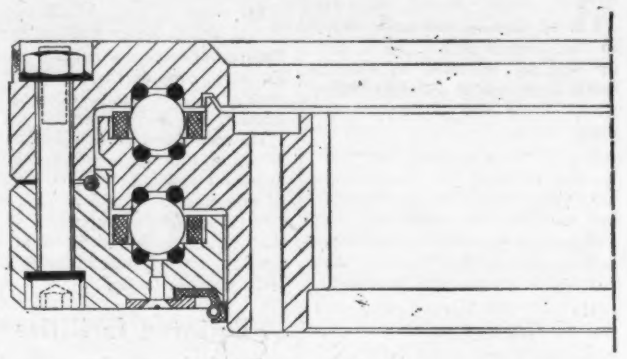
An important advantage in the use of sintered parts lies in the complex shapes which can be produced to close limits of accuracy without subsequent machining.

Dry bearings

Among exhibitors showing components manufactured in this way are Bound Brook Bearings who supply sintered parts in brass, bronze, iron, iron alloy, and various special purpose alloys.

When used as bearings they are impregnated with oil or p.t.f.e. dependent upon the application for which they are designed. They are marketing a material called Polyslip for dry bearings in which the bronze matrix is treated with p.t.f.e.

The bearing strength is provided by the bronze matrix and the dry lubricating properties by the plastic. Because there is no sticky liquid to trap dirt or dust and so carry it into the rubbing zone, these are able to operate more successfully than oil lubricated bearings where dirt and dust are prevalent.



Cross section of Roballo aluminium alloy slewing ring showing steel wire races.

quired for various steels to carry steam at high temperatures and pressures.

With the super-critical steam conditions of modern power stations, such as the Margam B plant which operates at 3,300 p.s.i. at 1,060° F., pipe design and selection of suitable materials is of paramount importance.

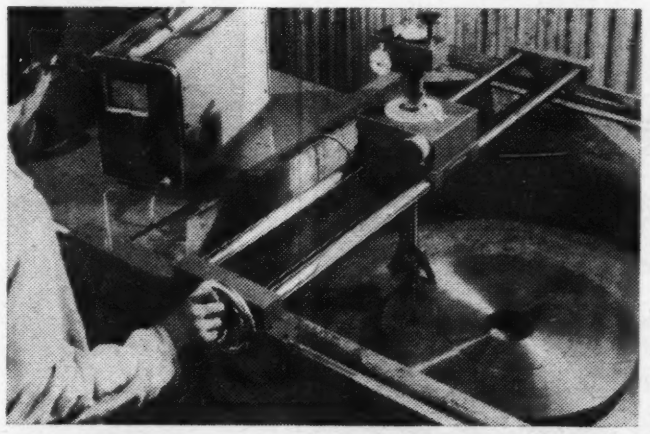
Examples of steels chosen for this exacting duty will be shown which offer advantages over the usual austenitic steels in high temperature strength and ductility.

At the British Steel Founders' Association stand, exhibits have been selected from manufacturers throughout the country, and represent a wide range of applications.

These are practical examples of the way in which the employment of steel castings can save cost or weight with economies in longer life and reduced maintenance.

Weight savings

Steel foundry techniques have advanced rapidly in recent years as the result of continuous research into material specification and utilisation, and have resulted in



Ultrasonic apparatus by Firth-Stampings for the inspection of turbine discs by the immersion method. A "blip" on the C.R.O. denotes the magnitude of a defect.

The long straight chain plastic is chemically inert, has a very low coefficient of friction, and can operate satisfactorily within −200 to +280 degrees C.

The new K-type Kopp Variator is to be exhibited for the first time by Allspeeds. This is a compact unit that can transmit 50 h.p. and is only 28in. long. It operates on a friction drive principle with disc and conical drive rollers and the makers state that a high efficiency has been maintained.

Depending on power to be transmitted, the output speed range can be extended to 12:1, the minimum output speed being 1/7th of the input speed.

An interesting display at the Firth Brown stand illustrates the different pipe wall thicknesses required for various steels to carry steam at high temperatures and pressures.

With the super-critical steam conditions of modern power stations, such as the Margam B plant which operates at 3,300 p.s.i. at 1,060° F., pipe design and selection of suitable materials is of paramount importance.

Examples of steels chosen for this exacting duty will be shown which offer advantages over the usual austenitic steels in high temperature strength and ductility.

At the British Steel Founders' Association stand, exhibits have been selected from manufacturers throughout the country, and represent a wide range of applications.

These are practical examples of the way in which the employment of steel castings can save cost or weight with economies in longer life and reduced maintenance.

Weight savings

Steel foundry techniques have advanced rapidly in recent years as the result of continuous research into material specification and utilisation, and have resulted in greater freedom for the designer to introduce strength or lightness.

A good example of weight saving in castings is given by a steel casting of a gear case for a railway locomotive oil engine with sections meeting optimum design requirements without excess metal.

It is manufactured on a quantity production basis in B.S.592 grade A steel and has sections of 0.2in. tapering to 0.1in; approximately 3ft. square by 6½in. deep, the weight is just under 1¼ cwt. and illustrates the freedom of design given by steel castings, with the shape dictated by stresses involved.

Roballo Engineering Co., are exhibiting for the first time one of their high strength aluminium alloy ball bearings cut away to show the steel wire races.

These units have been used in military radar and similar applications and the largest unit so far supplied is 90in. diameter.

A typical crane slewing ring 5ft. in diameter is shown. Special designs of ball and roller bearings from 2 to 24 feet in diameter are supplied by this firm.

Also of interest is a 6ft. diameter bearing for a 70ft. diameter fan for a large forced draught cooling tower. Its gear transmits 800 h.p. at 76 r.p.m.

High temperature

Creep and rupture information concerning Supertherm, the latest alloy for service at high temperatures developed by Lloyds (Burton) is available at their stand.

It has measurable hot strength up to at least 1,260° C., and can be produced as static and centrifugal castings.

Equipment incorporating components made with Rockite dough moulding compound is featured by British Resin Products.

This is a shock resistant thermo-setting material reinforced with glass fibre or sisal.

A feature of interest is a display of blow moulded Rigidex in the mass production of complex hollow components. This is a high density polyethylene and new applications are for cold water piping and cable sheathing are given.

A comprehensive range of electrical contacts and contact materials is shown by Johnson, Matthey & Co., together with a beryllium copper with beryllia-free surfaces to improve press tool life and a new high-conductivity spring material.

Bound Brook Bearings are exhibiting a porous stainless steel filter material — now on the market — suitable as the base for fluidized beds and for the distribution of bubbles in liquids.

The anti-corrosive and high temperature properties of this new material make it of general interest to the chemical industry.

Silicone rubbers

A system of 20 pigment dispersions for colouring silicone rubbers will be shown for the first time by the I.C.I. Nobel Division.

They are known as the Silcolor range and it is claimed that even colours can be reproduced easily and that the pigments are clean and convenient to use.

Applications include the colour coding of sleevings, tapes and cables. Silcoset silicone rubbers which cure at room temperatures will also be featured.

These are used for encapsulating electrical and electronic equipment, for flexible moulds to cast epoxy resins, and for coating conveyor belting to give a stick-free surface.

. . . AND CONFERENCE THAT RUNS WITH THE MATERIALS AND DESIGN EXHIBITION

Over 20 papers to be read on engineering research and progress

ENGINEERING designers from all parts of Britain and from all branches of industry will assemble at Earls Court, London, for the second Engineering Materials and Design Exhibition and Conference starting on Monday.

The conference will provide an opportunity for delegates to hear over 20 papers, read by eminent authorities in engineering research and industry.

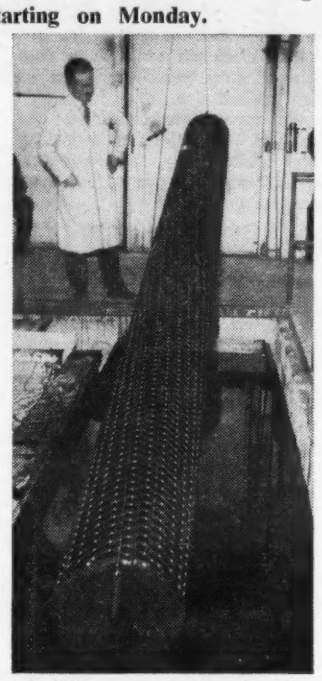
Products such as graphite and insulating materials, due to their particular structure and characteristics, have so far been of little use to the mechanical engineer.

These materials at the present time are finding new applications in rocket and atomic fields.

Recent developments in graphite is the title of a paper by Professor A. J. Kennedy, Head of Department of Metals, College of Aeronautics, Cranfield.

He outlines the method of production accounting for most of the graphite at the present time.

This may be said to be the change of carbon into graphite by high temperature treatment, using carbon aggregates derived from, say, petroleum residues.



A 17ft. vacuum roller for the paper industry being dip-coated in p.v.c.

New techniques

After any required additions of lamp or carbon black, or natural graphite have been made, a binder material is added. The mix is then pressed or extruded and baked at between 900 and 1,300° C.

In recent years two important techniques have emerged: a further stage of treatment to obtain improved properties, in particular impermeability; and a pyrolytic graphite.

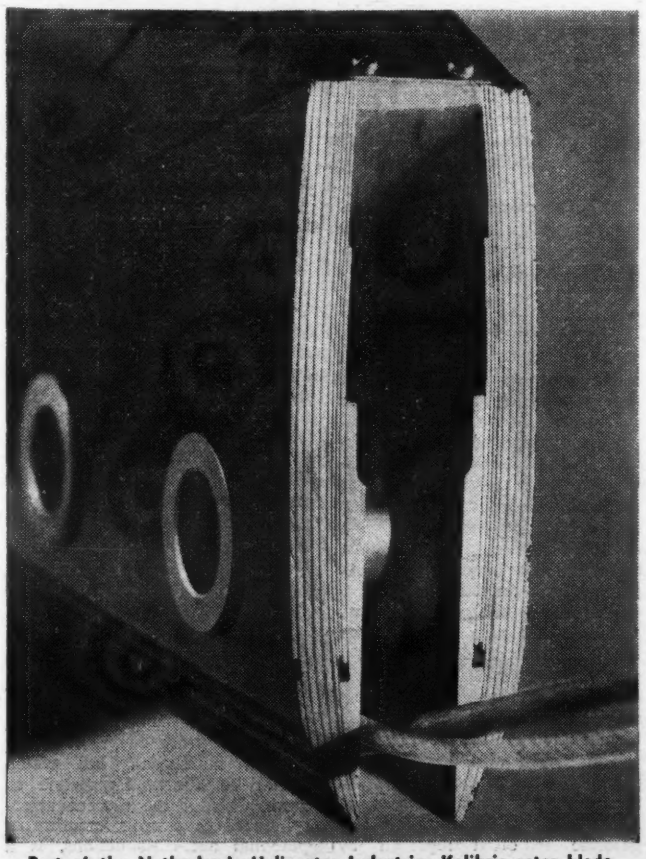
This is produced by thermal breakdown of gaseous compounds such as benzene, methane, and propane, and the deposition of graphitic carbon at a temperature of about 2,000° C.

Pyrolytic graphite is different in microstructure from graphite produced by conventional means. Prof. Kennedy discusses the properties of this material and shows photographs of growth cones and etching effects.

Improvement of graphite by the application of an impregnation technique has been of particular relevance to nuclear engineering, and also exerts a marked effect on the mechanical properties.

Interconnecting micropores are filled by a suitable material and volatile constituents are driven off by slow heating. A regraphitisation treatment is applied if necessary.

Furfuryl alcohol and a concentrated solution of sugar have been successfully used in this connection.



Part of the Netherlands Helicopter Industries Kolibrie rotor blade, showing laminations at the root end. Bonding allows freedom in reinforcement and riveting problems are eliminated.

Prof. Kennedy discusses the properties which limit the wider use of graphite as an engineering material, and the strength and thermal properties in high temperature applications.

In new developments he mentions that filaments of graphite, suitably woven or compounded, are under investigation and that wound structures built up from monofilaments of pyrolytic graphite might have technological application for pressure vessels of certain types.

In concluding, he mentions that the old idea of easy slip between layer planes in the lubricative properties of graphite is now under suspicion.

Recent work at the Battelle Institute in Geneva, suggests that graphite layer planes break away and form scrolls, acting rather like roller bearings.

Serious attention is being paid to the fundamental mechanics of the graphite structure by a metal physics approach, utilising the concepts of dislocations and stacking faults.

Recent developments in Insulating Materials by J. Wainwright, insulation engineer with English Electric, is a paper giving broad coverage to this field.

He mentions that there are few new materials coming into use and that most emphasis is on the adaptation of existing materials.

Failures diagnosed

By the development of new testing instruments there has been an increase in knowledge of mechanisms of insulation deterioration and failure.

There have been no major developments in Britain in using gases as dielectrics, apart from hydrogen and compressed air, but considerable work in the physico-chemical evaluation of mineral oils is at present being undertaken.

Most changes have taken place in materials in the solid state and the author selects some of the more interesting types for consideration.

Mineral filled epoxy resins find application in all parts of the electrical industry. These are used for the manufacture of such parts as support insulators, terminal blocks, instrument transformers, and windings of industrial motors.

Resins with much greater flexibility are needed to overcome such factors as locked-in stresses and although formulations have been suggested, none has been particularly satisfactory so far as the long-term stability or electrical characteristics are concerned.

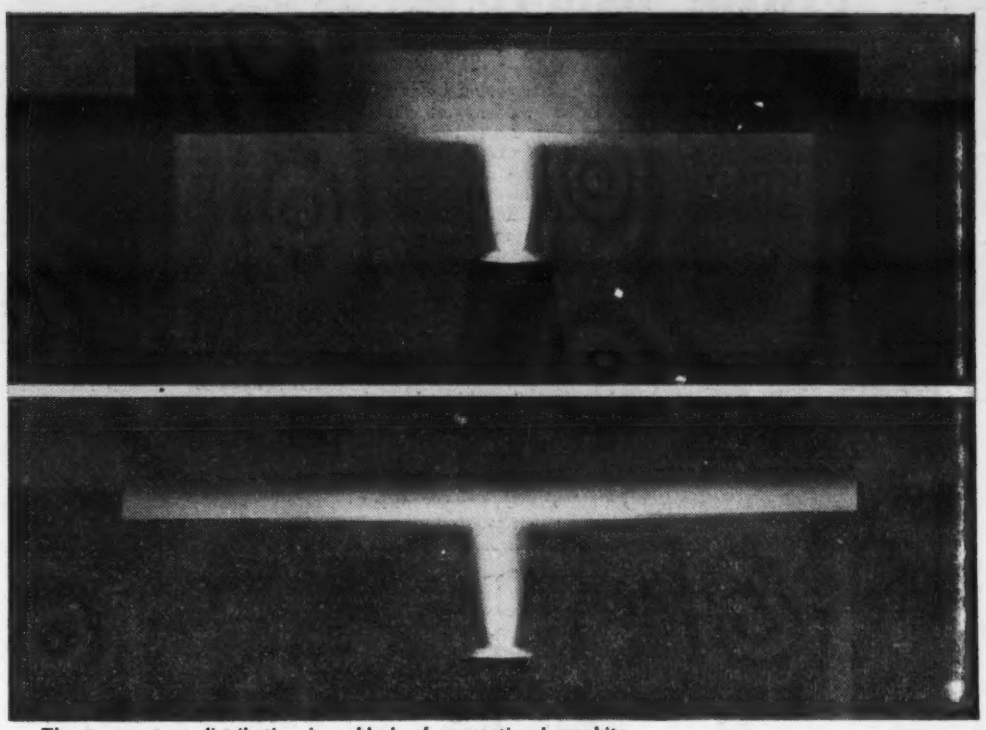
Glass fibre is the most used material for increasing the mechanical characteristics of synthetic resins for certain applications, and may be obtained in many fibrous forms.

Cold-set silicones

In laminates and in moulded shapes, polyester resins reinforced with glass fibres have become popular in various forms of switchgear and have improved mechanical and electrical characteristics over moulded phenolic type materials.

The author discusses the uses and developments of silicones and in particular mentions one development being followed at the present time. This is their use as tapes in the form of cold vulcanising fluids to act as moisture seals over more conventional materials.

For the insulation of large machines mica is still considered supreme. A minor change that has taken place is that synthetic bonds have replaced natural ones.



The temperature distribution in a block of conventional graphite compared with that in a block of pyrolytic graphite when each is heated by an oxy-acetylene torch. (Courtesy High Temperature Materials inc.)

New form of mica

Recently there has been an important change in the form of the mica itself. Instead of using mica flakes, these are broken down into minute pieces and built up into a sheet on a paper-making machine.

After reinforcement with textiles and treatment with resins they can be used for insulating.

Cellulosic material developments by U.S. companies have led to improvements in the thermal stability of materials such as papers and pressboards used in oil-immersed transformers and distribution networks.

These materials do not yet seem to have been made available in the U.K.

Reference is made to insulation which may be exposed to nuclear radiation. These effects generally cause severe deterioration but in certain, as yet limited, cases it is possible to use radiation to improve the characteristics of materials.

Most work has so far been on polyethylene, and commercial plants have been working on film and insulated wire for some years. By carefully controlling the amount of irradiation given to a piece of wire, mechanical characteristics are improved.

Plastics and steel

The softening point can also be increased so that less danger arises of material melting under short-circuit conditions.

Two papers are to be read at the conference that will be of interest to engineers in most fields: Plastic Coatings by N. Vinson, managing director of Plastic Coatings, and Plastic Coated Sheet Steel by F. Smith, London manager of John Summers & Sons.

In the latter paper the author in his introduction mentions that of some 30 million tons of steel sheet produced in the world per annum, nearly all of it is coated with an organic or metallic finish at some time.

The properties and characteristics of p.v.c. coated steel sheeting are outlined by the author and reasons are given for its choice.

In the paper on Plastic Coatings various materials such as p.v.c., nylon and p.t.f.e., their applications and usefulness are discussed. Coatings of p.v.c. are mentioned as having the greatest growth potential, and as superseding conventional rubber linings for some application at a fraction of the cost.

A factor which previously hindered development of this material in various applications, was the absence of a suitable primer for good bond between coating and metal.

This problem has now been overcome and companies in this country are marketing plastics coated sheeting on a wide scale.

Adhesives

Adhesives for engineering by E. J. Catchpole, manager of the bonded structures div., CIBA, covers a subject which is little known to engineers in many fields.

Development of modern synthetic resin adhesives apart from wood applications, have enabled metals to be permanently joined and over the past 15 years they have played an important part in structural work.

Synthetic resin developments for wood adhesives have reached a stage where full reliance can be made on the bond for important structures including those exposed to weather conditions.

Possible uses for engineering work are many and varied and the author deals with those adhesives and applications for which reliance is placed on a very strong bond structurally, and in particular with metal to metal bonding.

Wider uses

Pretreatment of materials, adhesive application and curing are also discussed.

The most important application of metal bonding adhesives has been in the aircraft industry.

Bonding brake linings to brake shoes is an application in the car industry, and the paper mentions that more than 80 per cent of relinings in the U.S. are done by this process.

Sandwich construction is one of the most interesting developments coming from the use of synthetic resin adhesives, offering light weight, high strength and stiffness-to-weight ratios, and good design features.

Some interesting applications are mentioned in various fields. The author concludes by discussing metal bonding behaviour under long-term conditions.

RADYNE
REGISTERED TRADE MARK

IMPROVED METHODS OF INDUCTION HEATING

A line of R.F. induction heaters in service with the Ford Motor Company, Basildon, Essex.

Many high production processes are best carried out by radio frequency heating . . . best because of its inherent controllability; best for blunt indisputable facts of economics.

ADVISORY SERVICE
Radyne Ltd are leaders not only in the theory of induction heating but also in the best ways of using it in practical, down-to-earth industrial problems. We will be happy to discuss your problems without obligation.

INDUCTION HARDENING
R.F. heating will harden components locally with the greatest precision, and is far quicker and cheaper than conventional methods of surface hardening, localised through hardening, and tempering.

SOLDERING AND BRAZING
Soldering and brazing by induction are quicker and cleaner than by conventional methods. Localised heating restricts the flow of solder to the joint area. Both parts to be joined are raised to working temperature together. Scale and discoloration are reduced to a minimum.

THROUGH HEATING
In forging, stamping and other processes, rapid through heating to forging temperature saves time and space, reduces scaling and in consequence wear and tear on dies, improves dimensional accuracy and gives better working conditions.

ANNEALING
Localised annealing between processes can be carried out with greater speed and control by induction methods than by any other.

Across new frontiers

RADYNE LTD
WOKINGHAM BERKS ENGLAND
Telephone: Wokingham 1030 (12 Lines)
Cables: Radyne England
P.7018

ANTI-SKID DEVICE USES STRAIN GAUGES

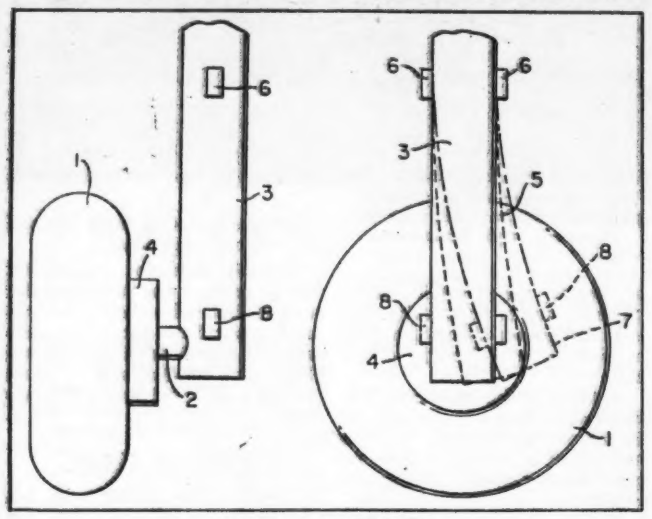
EXISTING anti-skid devices all involve the need for obtaining a mechanical or electrical signal from a rotating wheel, and are all comparatively bulky. In **Patent No. 879,280**, the **Goodyear Tyre & Rubber Co.** propose the use of electrical resistance strain gauges for measuring brake torque and brake drag and thus sensing the beginning of a skid—a relatively simple, inexpensive, durable and lightweight system which has no mechanical or electrical interconnection with the braked wheel. By measuring the difference between the brake torque and brake drag signals, a deceleration signal can be obtained which can be used to reduce the braking force and prevent a wheel skid.

Referring to the diagram, upon applying the brakes the drag between the surface of the wheel and the ground produces a bending moment on the support strut 3, bending the strut towards the (exaggerated) position shown by the dotted line 3. Thus, strain gauges 6 applied to the strut 3 at a point where the stresses are primarily due to the brake-drag bending moment will give an indication of brake drag.

The brake torque creates an additional moment on the strut 3 tending to rotate the lower end of the strut towards the position shown by the chain dotted line 7. Strain gauges 8 positioned on the strut 3 in the region most subject to the moment due to brake torque will then produce an indication of brake torque.

An alternative arrangement is to apply the strain gauges to the axle at suitable points instead of to the support strut.

The amplified outputs of the brake torque and brake drag strain gauges respectively are connected to a difference amplifier. The difference output, further amplified, can be connected to a pressure controller controlling the braking force on the wheel so as to reduce skid. The patent describes in detail the electrical circuitry.



PATENT No. 879,280

RECIRCULATING BALL NUT AND SCREW

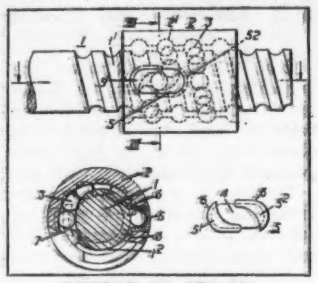
A COMPACT, high-efficiency circulating ball nut and screw mechanism, suitable for general application but particularly for steering mechanisms, is put forward by **Cam Gears, Ltd.**, in **Patent No. 879,462.** In this invention, the return track for the balls is formed by an insert fitted in a recess in the nut and held in position by merely fitting together the screw and nut.

Referring to the illustration, the helical groove in the nut 2 is partly removed by forming an opening through the wall of the nut. An insert piece 5 fitted into this opening provides a helical transfer groove 4, shaped to transfer the balls 3 from one point of a turn of the helical groove 1¹ in the screw 1 to another point in the same turn.

The flange 6 on the insert bears against the inner face of the nut 2 so that when the nut and screw are assembled the insert is located in position. It cannot move inwardly because the flanges 5¹, 5² on the insert are arranged to seat snugly on the crest of the helical land on screw 1.

The insert, and its corresponding recess, can be of any desired cross-sectional shape. Preferably it is formed of a mouldable material such as a soft metal or plastic. The recess in the nut need not extend completely through the wall; if a "blind" recess in the inner wall of the nut is adopted, the flange 6 on the insert would not be required.

Because the length of the helical track is reduced from a complete turn by only a small amount, a very large extent of the helical track can be packed with balls 3 to transcit load. The patent also covers the use of two or more similar inserts to provide return tracks for two or more circuits of balls: the different return paths can be arranged so that the return point of one coincides with the removing point of another. Thus, viewed in end elevation, there would be a complete ring of packed balls, although the complete ring is made up of parts of different helical tracks.



PATENT No. 879,462

BARRELLING CHIPS

FOR use in barrelling and tumbling processes, chips made from a homogeneous mixture of ball clay, china clay and a particulate abrasive mixture have particularly satisfactory wear properties and provide a very satisfactory polishing action on workpieces during the final stages of a barrelling process—so claim **Rolls-Royce, Ltd.**, in **Patent No. 880,532.**

The chips are formed by mixing together dry powdered ball clay, dry powdered china clay and an abrasive material such as emery, garnet grit, pumice, diamond dust or aluminium oxide. The dry mixture is wetted with lime-free water and a wetting agent to a uniform mass. After allowing the mixture to stand for a length of time to drain, it is again stirred until it attains a uniform moisture content (desired value 15-16 per cent). It is then formed into barrelling chips of any desired size.

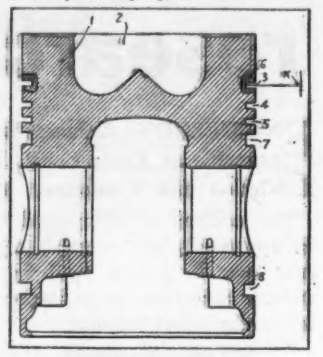
By appropriate selection of the relative proportions of ball clay and china clay, the porosity, density and strength of the chips can be controlled.

PISTONS FOR I.C. ENGINES

FULL-FACE contact between piston ring and cylinder wall at operating temperature, providing efficient control of oil consumption, is the object of **Patent No. 878,559** granted to **Wellworthy, Ltd.** The invention relates particularly to pistons for use in supercharged compression-ignition engines running at high temperatures and with a b.m.e.p. of 130-200 p.s.i. or more.

A piston ring carrier insert, or inserts, of harder metal such as cast iron, ferrous metal or preferably a Nimonic alloy, is bonded to an aluminium alloy piston. At ambient temperature, the mean diameter of the piston head increases from the top end of the head towards the gudgeon pin axis in such a way that at normal working temperatures the head will be substantially parallel sided.

The compression ring grooves, of which at least one is machined in the ring carrier inserts, are machined so that their side walls are frusto-conical and inclined upward, from the bottom of the ring groove to the periphery of the piston, towards the top of the head at an angle between ¼° and ¾° to planes perpendicular to the piston axis. The upward run of the side walls of the grooves thus lies between 0.0043in. and 0.013in. per inch. Preferably the angle is about ½° with an upward run of between 0.008in. and 0.011in.



PATENT No. 878,559

With this arrangement, the greater expansion of the top end of the piston head under working temperatures causes the ring grooves to take up positions substantially in planes perpendicular to the piston axis, thus ensuring full-face contact between ring and cylinder wall. The specified angle of upward run ensures that the piston rings cannot contact the cylinder wall at their upper edges only, which would cause the oil film to be scraped upwards into the combustion chamber where it would be burnt.

AUTOMATIC FLYWHEEL PRODUCTION

Assembly operation combined

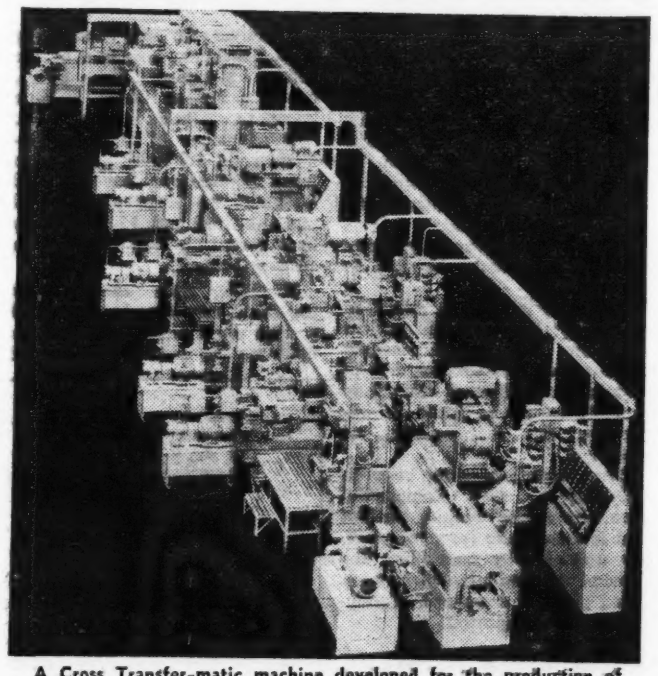
A TWO - SECTION transfer machine developed recently by the Cross Co. of Detroit for the production of automobile type flywheels has an assembly operation (fitting the starter rings) that is carried out automatically in addition to the machining of the flywheels from blanks.

Two different designs of flywheel are produced on the same machine and the complete change-over from one type to the other can be accomplished in two or three hours.

While the primary object of the machine's development was to lower production costs, an improvement in the quality of the product has also resulted.

The two major faces on the transmission side of the flywheels are now consistently parallel with one another to within 0.0005 in. in 1 in., and the range in quality of surface finish has been reduced.

Five sets of chucking and tool slide units are used in the first section of the machine. These carry out all the facing, turning, chamfering, undercutting and grooving required on both sides of the flywheel.



A Cross Transfer-matic machine developed for the production of two designs of flywheels.

Carbide throw-away inserts are used for roughing cuts and a combination of carbide and ceramic inserts for finishing.

At one station a finish facing operation is shared between carbides and ceramics, a carbide tool finishing a small diameter face while a ceramic tool is used on a larger diameter.

This allows efficient cutting speeds for both types of tool to be obtained with only one spindle speed.

In the first section of the machine the flywheels are machined in pairs while in the second they are dealt with individually. This has necessitated the provision of a banking station between the two sections.

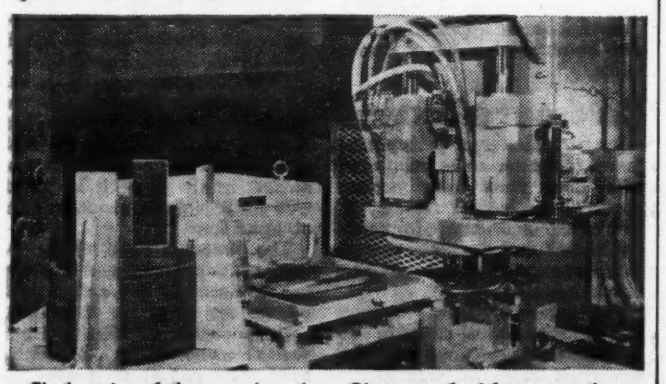
Automatic gauging

Various holes are drilled, reamed, and tapped at the earlier stations of the second section and three diameters (including the ring gear mounting diameter) are checked automatically by air gauge probes while the parts are moving between one station and the next.

If any diameter is outside limits the machine stops at the end of its cycle until the fault has been corrected.

Following automatic wash, rinse and drying, the flywheels finally pass to a vertical press where starter rings are put on.

A "building block" system of construction for the transfer machine allows the sequence of operations to be changed with relative ease.



Final station of the second section. Ring gears feed from magazine at left to induction heater, centre, then to press at right.

Code of ethics needed in special machines field

COMPETITION is the life-blood of American industry. One might reason that if a little competition is good, more competition is better. Not so, in at least one area—special machinery design and construction.

In recent years bids and quotations for special machinery have increased greatly. Under the guise of shrewd purchasing practices, excessive competition is being used to exploit special machinery builders.

This is accompanied by duplication of design efforts for which the bidding organisation receives no compensation.

* * *

The procedure is simple, merely send out invitations to submit bids—the more the merrier—and take a good idea from each plan submitted.

This is unfair. Certainly an industrial firm seeking a new building to house its manufacturing facilities would not ask 20 or even ten architects to submit drawings or even preliminary sketches, analyses, or layouts without putting them on retainer.

Why should this same company, seeking to improve its production facilities through design of new equipment originated and designed outside their organisation, expect special machinery builders to give them something for nothing?

The tourist who drives into a filling station to have his tyres and radiator checked and asks for a road map without buying any gasoline is often regarded by station attendants as a "wind, water and information customer. The situations are not too dissimilar.

A great deal of preliminary work—in fact the very essence of the machine, the design principle — must be completed before a special machine builder can sit down with the prospective customer for an intelligent discussion of a new machine.

Consulting engineers will not work without retainers. The line of demarcation appears to be where the consultant or design phases are combined with the build and test phases.

Organisations which design and build are expected to submit the design proposal gratis with only the successful bidder recovering his design costs on delivery.

If the design and build portions were separated, more conservative bidding would result.

At present each job must be bid to cover a portion of the expenses on the previous job which was not secured and on the next one which may not be secured. The added costs are ultimately passed on to the customer who buys the equipment.

* * *

Special machinery builders could certainly be more thorough and do a more complete design job if they knew they would receive compensation for all work done on a proposed project.

What is needed, but which would be almost impossible to accomplish in the present atmosphere of government scrutiny of potential anti-trust actions, is a code of ethics to improve operating efficiency.

EDUCATION and TRAINING

THE problem of training nuclear engineers to design and operate the present range of reactor systems has been approached realistically by the United Kingdom Atomic Energy Authority. There are now three training schools within the Authority, and several technical colleges run courses to fit in with syllabuses of the three training schools.

Courses on nuclear engineering

by our education correspondent

THE Calder Hall Operations School was opened in January, 1957. The school is designed to train those who are concerned with the operation and day-to-day running and maintenance of a reactor.

These personnel will not require a highly theoretical knowledge of reactor kinetics and nuclear physics, to the degree of the design engineer but, they must be able to appreciate the practical implications of the kinetics.

If the Operations School gave both the initial theoretical lectures required in basic nuclear physics, and then continued with the practical applications for the control of the reactor, the course would last between 12 and 16 weeks.

At present there are many countries in the process of buying or having bought their own reactor, either for research purposes or producing power.

Thus there is a considerable number of people who need this specialised form of training, and up to this month 554 students have attended the Operations School.

If each course lasted four months a large organisation would be necessary to cater for the number of students at the Calder Hall School.

However, as the popularity of nuclear power increased so a number of universities and technical colleges began to offer courses varying from a few weekly lectures to extended courses for higher degrees.

The Reactor School at Harwell set up in 1954, is designed to give a theoretical training in nuclear physics. The courses usually include a wide range of experiments and for this purpose the Reactor School has its own well-equipped laboratory.

In addition, use is made of some of the more extensive facilities on the Harwell site. For example experiments on the research reactors, and sub-critical assemblies.

There is a standard course on nuclear physics, which includes lectures on health physics and control.

Calder Operations School adjoins Calder Hall, which has been supplying electricity since October, 1956. This is the eighth course of international students since the school opened. Left to right: Y. Imai from Japan, L. W. Thorne, assistant manager of the school, K. Misunaga from Japan, and G. W. Gersten from Germany in the classroom.

Other courses

Other courses are also run for senior technical executives, and control and instrumentation engineers.

The Radioisotope School at Wantage has organised courses under many headings in the chemistry field, and again there is also a standard course.

The many-varied ways in which radioisotopes can be used in industry is seldom realised by the industrialist, and several courses have been arranged for members of the Institute of Directors. As a development from this a four-day course has been arranged for trade union officials.

Basic principles

Within the past two years, short comprehensive full-time courses have been offered by three colleges providing an intensive study of the basic principles of the physics and engineering of nuclear power reactors.

The course length varies from about six to nine weeks, and is accepted by both the Calder Hall Operation School and the Reactor School at Harwell to cover the first part of their standard courses.

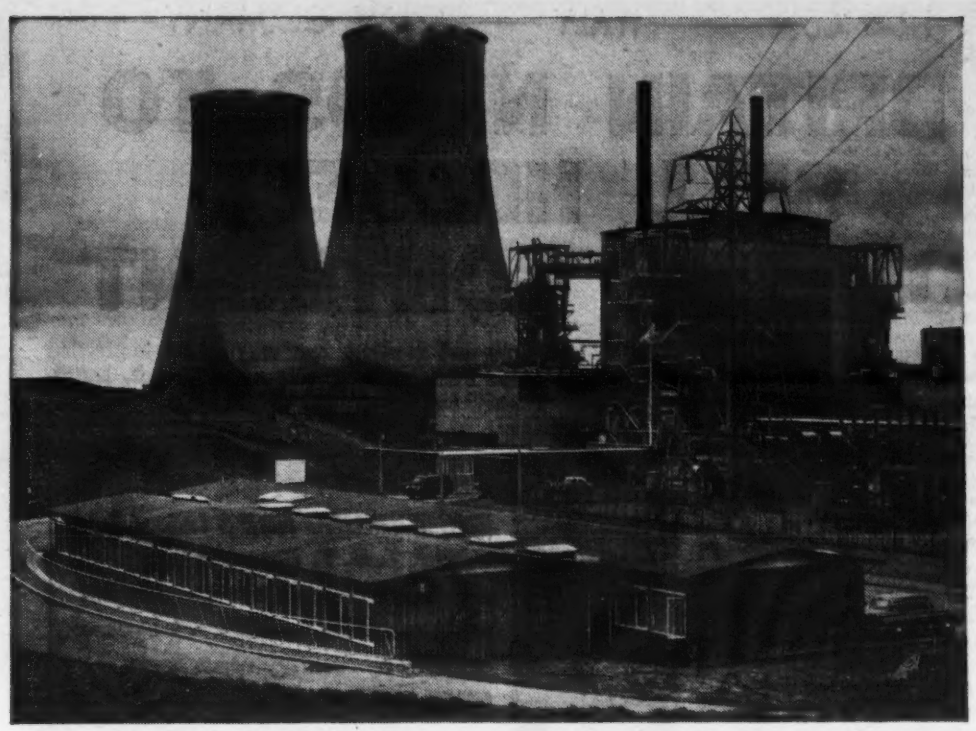
This allows the two schools, firstly to concentrate more on the specialist courses for which they are the most suitable, and secondly to give more individual attention; since it is now possible to run more courses with a smaller number of students in each.

Suitable preliminary courses are being offered at the Bradford Institute of Technology, Birmingham College of Advanced Technology, and Salford College of Advanced Technology.

A similar course lasting six weeks on a full-time basis is also offered at the Whitehaven and Workington Colleages for Further Education.

This course has been specifically designed to be complementary to the Calder Hall Operations School standard course which lasts a further six weeks and in view of the locality is very suitable, being only six miles from the Calder Hall site.

The primary object of the Operations School is to develop the basic knowledge gained in the technical colleges to a thorough understanding of the operation of Calder Hall. Recently it has been possible to introduce a section concerning the operation of the civil nuclear power stations.



Calder Hall in the background — in the foreground Calder Operations School.

Foreign students

About two thirds of the students attending the courses are from the U.K.; 29 foreign countries have also sent students, the largest numbers coming from Italy and Japan.

This is explained by the British reactors under construction at Latina in Italy by the Nuclear Power Group, and Tokio Mura in Japan by the General Electric Co., Ltd.

Half of the U.K. students are from the Central Electricity Generating Board. They will shortly be operating the present range of civil reactors.

Conventional stations

The majority have been operating personnel at conventional power stations, and in order to obtain a thorough background in nuclear power theory they have attended the full course at the Reactor School, Harwell.

The Calder school has a manager and two resident lecturers, but for specialised subjects personnel from the Calder site are employed.

Tours are made at other UKAEA establishments, and usually a visit to the uranium processing plant at Springfields is included.

To assist in the training of the students, an electronic reactor simulator is available. About one half of the course is taken up with experiments and the other half with lectures.

The simulator desk was taken from a reactor and all the units are standard reactor equipment.

A new simulator has been ordered from Short Bros. and is due for delivery early next year; it will be a much larger and more versatile machine than the present model which was built by the Authority.

Some of the effects that may be demonstrated on the present simulator include: The effect of different neutron source strength on reactor start-up; effect of various control rod speeds on reactor start-up; effect of unlimited control rod withdrawal; variation of doubling time during rod withdrawal; effect of step and ramp functions of reactivity; effect of positive and negative moderator temperature coefficients; effect of negative and zero fuel temperature coefficients; effects on temperature and reactivity caused by changes in coolant inlet temperature variation with fuel element can temperature with rod position and coolant flow; and behaviour of the reactor under fault conditions, such as blower failure.

Senior executives

The standard course usually takes about 25 students. Others include a special one week course designed to give an overall appreciation of reactor control to senior executives and courses for employees on the Calder Hall site which may last up to six weeks.

An example would be by the resident engineers in charge of instrumentation, plant maintenance, steam and electrical plant operation or the health physicist. In some cases specialists will be called in from one of the other Authority establishments.

ENGINEERS BECOME TEACHERS

The trend reverses — but industry still gains

by our own correspondent

AT a time when so many science teachers have been lured into industry, it is refreshing to find signs of a trend in the opposite direction. Among the students enrolled for the Diploma in Education at Oxford University this year are five young graduate engineers.

"I had always wanted to be an aero-engineer", David Brown, an engineering graduate from Imperial College, London, told me, "but I found myself fitting into a vast industrial machine and there seemed to be little opportunity for creative work. I realise that a junior cannot expect to do important work straight away, but eight weeks of churning out somebody else's calculations on a computing machine altered my whole outlook."

Brian Clayton, a civil engineer from Leeds University, agreed that the industrial experience gained as a student left much to be desired. "I was interested in what was going on but somehow the personal contacts were very limited. The attraction of teaching has been the closer personal contacts with people as **people.**"

A Birmingham University chemical engineer, David Norton, admitted that he had always been uncertain about his choice of career; his experience of industry had been interesting but he had come to the conclusion that it was "impersonal and rather a rat race". He had taught for a year and was now convinced that teaching gave more of a challenge than most jobs open to young graduates in industry.

My query about salaries brought quick replies. "I haven't given the financial side much thought", said Alexander Romiszowski, an Oxford graduate, "but I should think that for the first few years as a teacher I'll be earning as much as I would have done in industry".

Rodney Wilson, another Leeds graduate, had given the matter very careful consideration. He felt that the starting salary would not be much different but future prospects were better in industry.

Salary not important

However, he thought there were much more important factors to be considered when choosing a career—a married man was likely to prefer work of a fairly settled nature and many jobs in civil engineering involved much travelling about.

Are these young engineers lost to industry? If so, they will make good the loss of a hundred-fold. Good luck to them, I hope others will follow. But there are some pointers here for those responsible for arranging practical experience for neophyte engineers!

EMPLOYERS CONFERENCE

THE East and West Ridings Regional Committee of the Industrial Training Council plans to hold an employers' conference in Leeds, early in 1962—probably on January 18. The subject will be, "Planning systematic training for work people".

This follows news that some 64,000 school-leavers can be expected next year—an increase of 8,000 on the figure previously estimated.

The committee hopes to increase the number of apprenticeships for boys to 13,500—1,500 more than were absorbed in this way during the school year ending in July, 1961.

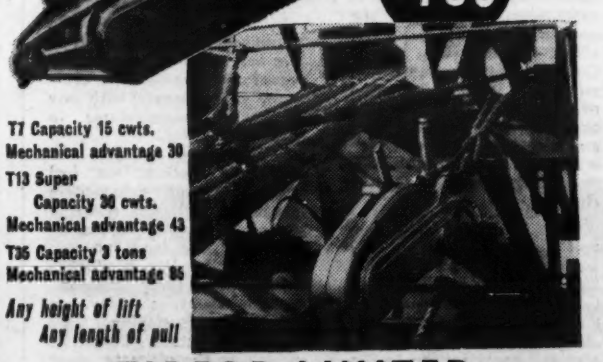
Councillor A. King (chairman of the committee), stressing the need for employers to increase their intake of apprentices, suggests that larger concerns which at present have no training facilities for apprentices should consider providing them, and that the establishment of group apprenticeship schemes be considered by smaller firms.

There's always a job for the TIRFOR

For all Pulling & Lifting

POWERFUL PORTABLE VERSATILE

- Operated and carried by one man
- Gives a controlled reversible pull over any distance
- Can be used anywhere—in any position



T7 Capacity 15 cwts. Mechanical advantage 30

T13 Super Capacity 30 cwts. Mechanical advantage 43

T35 Capacity 3 tons Mechanical advantage 85

Any height of lift
Any length of pull

TIRFOR LIMITED
(ONE OF THE SIMM ENGINEERING GROUP)
27 BROOMGROVE RD. SHEFFIELD 10 Tel. 64436

FRANCE—ITALY—W. GERMANY—BELGIUM—HOLLAND—LUXEMBOURG

BRITAIN NEEDS TO SELL HERSELF ON THE CONTINENT

AFTER six countries and dozens of interviews and meetings one very strong impression remains. This is the great difference in Europe between the familiarity of French, Dutch, Italians and others with Britain and her achievements and the relative lack of knowledge of her industries.

ENGINEERING NEWS Industrial Editor, J. D. F. Perry, recently returned from a Common Market tour, summarises his week-by-week, country-by-country reports on BRITAIN'S prospects.

Travelling through the countries of the Common Market it has been a rarity to be reminded by advertisements of British industry or of British-made goods.

Yet where U.K. firms have decided to promote their products in Europe with the full weight that would be put behind a home market campaign the results have been more than amply rewarding.

This is the first main lesson British manufacturers have to learn for Common Market success. It is that once the UK becomes a full member it will be necessary to plan for France, Italy, West Germany and the Benelux countries as areas of the home market.

The rapidly rising opportunities in all EEC countries spring from similar underlying causes.

The largest single factor is that of rising real incomes. This has so far been seen most clearly in West Germany and in Northern Italy.

Rapid rise

Holland, many of the regions of France, those areas of Southern Italy now being industrialised and also Belgium and Luxembourg are all set for rapid improvements in the next year or two in personal standards of consumption.

This will present the domestic appliance manufacturers of the Common Market with a double challenge.

Large numbers of new customers and the readiness of many others to change existing equipment on styling and performance grounds promise new high levels of sales.

At the same time competition and the lowering of manufacturing costs by longer and longer production runs may well tend to concentrate this industry in fewer hands.

Providing for the domestic appliance market may turn out to bring a number of very large prizes indeed to a very few winners.

The recent history of the Common Market has been one of increasingly full employment. The prospect is one of shortage of labour and of an overriding need to raise levels of productivity.

For this reason the sharpest questions put to me have been on British developments in methods for higher production and automatic control of machines and automatic control of machines and processes.

The import bills of the EEC countries show their readiness to go to the United States for advanced machine tools and for industrial electronic control systems. British developments like the David Brown work with EMI and the General Electric Co.'s co-operation with American interests in on-line computer systems for industrial processes are keenly watched by European manufacturers for whom improvements to their productivity, the flexibility of their manufacturing capacity and the lowering of their unit costs are all more important factors than marginal differences in price.

Only a few

It is common knowledge that only a relative handful of British manufacturers are taking full advantage of the many needs of industries already fully extended and committed to a future of expanding output.

The broad conclusion for British manufacturing industry of a move into the Common Market is the same whether for producers of consumer goods or of capital equipment. It is that if the opportunities of the market and of the widely recognised quality of British manufacture are fully seized with vigorous promotion and adequate local representation there is here a real chance to correct the long standing weakness in the U.K. overseas earning capacity.

The main lines along which moves need to be made to bring British industry its full reward from the Continental markets are by no means mysterious.

In not one of the six Common Market countries was I told that sufficient British representatives were living in the area or making sufficiently frequent calls. Over and over again I was told of firms where an English salesman would appear once a year while the German, or sometimes Italian, representative was round at least each month.

Trained men

And the need for British industry is not simply to equal the sales effort put out by West German concerns but to put an even greater number of trained representatives into Europe. For the first part of their job will be one of education. It is necessary, before substantial and steadily rising sales are achieved in, for example, some of the French provinces, for local manufacturers to be made aware of Britain as a manufacturing nation, and as one who now keeps to delivery promises.

Alongside questions of representation are those of service. There are excellent examples of U.K. firms putting in service facilities—particularly in machine tools and certain car firms. The results have been sharply rising machine tool sales and, under difficult conditions, improving sales performances by certain car producers.

The setting up of agencies and full facilities throughout the Common Market by the car manufacturers meets, in some locations, the difficulty that Volkswagen or Peugeot or some other European concern are already retaining the best people. Where a vigorous effort has been put in time and persistence have overcome this particular difficulty.

Prompt repairs

It is a short step from the expected service facilities and mechanical performance to styling and presenting the equipment in a way that appeals to the customer.

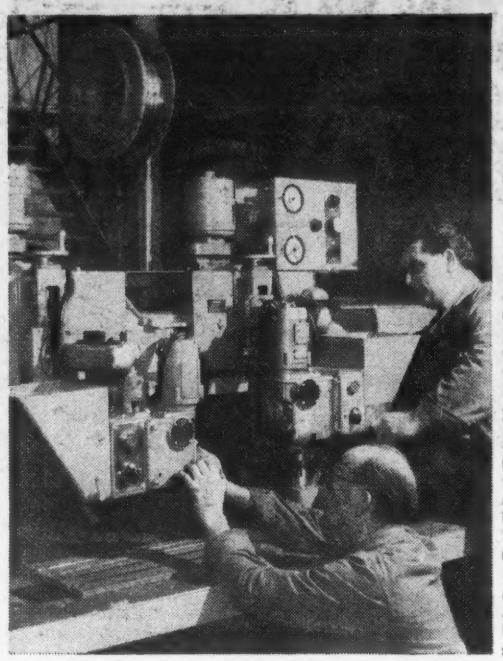
The essential, in the eyes of a European manufacturer, is that he should be guaranteed prompt repair and maintenance, preferably from a European base.

This is a point that will have growing importance. The rising volume of capital tied up in manufacturing equipment makes breakdowns more and more costly. The British machine tool manufacturer who, with a West German base of his own parts established, said that any part could be replaced by the end of the week found his sales chart accelerating in a thoroughly healthy fashion.

This is not confined to radio sets and motor cars. In industrial equipment, where price and performance of rival machines may be closely together, appearance, particularly in the Italian market becomes an important deciding factor.

In the small and medium size car markets the sprightly and new lines of the Ford Anglia and the more recently introduced Consul Classic have made strong impressions in Italy and also in France with notable effects on sales totals.

A real dilemma for British industry, or some parts of it, is presented in the metric problem. Like all real dilemmas there is no simple answer. America and the Commonwealth are not metric. The Common Market is.



Against intense competition from continental manufactures, British-made welding equipment is finding a growing market in France and other European countries, particularly in the automatic field. These fully automatic submerged arc welding heads, at the Lincoln Electric Co., Welwyn Garden City, Herts, are at the final assembly stage before being sent to France.

QUOTE

MR. W. HUMBLE, international sales manager of Hawker Siddeley Aviation:

"There is no doubt that we shall be better off within the Common Market than outside it.

"At present, although we are members of Nato we are not really in 'the club' formed by the Common Market countries.

"We have already formed ties with industrial concerns in France, Germany and Belgium but this is really not the same as being full members of the Community."

The effect for British industry of finding itself with a home market enlarged to the Pyrenees, to southern Italy and the East German border, would be to bring this problem into immediate and possibly painful prominence. For a firm with its new Home Market on the metric system and established customers intent on still using feet and inches in the Commonwealth would have a difficult decision to take.

This may be found to be one of the greatest single difficulties for industry in the move into full association under the Treaty of Rome.

There is not the slightest doubt that for success in Europe tenders must be submitted using the metric system. Without this, I was told a convincing number of times, the company submitting the uncooperative tender would be lucky to receive even an acknowledgment.

Optimism

The shortest way to summarise the way in which I found European factory executives, economists and bankers looking forward to Britain's joining the European Economic Community is to say that I met almost unanimous eager optimism.

Dutch engineers with their swiftly built and fast-growing industry, Germans proud of the efficiency of Volkswagenwerke, Italian chemical engineers and many others saw the entry of Britain to the Market as its extension by 50 million prosperous free-spending "new Europeans".

Two ways

The manufacturers of the present EEC propose to meet the new situation in two ways. Where suitable they will make uninhibited sales efforts with everything from clothes and cars to heavy duty machine tools and civil engineering contracting. The wind of change, an economic one, will blow keenly on industrial estates and along the high street.

The second approach will be no more than an extension of a furious rate of trade and technical agreement negotiations that have now been going on around Europe for rather longer than the period in which the Common Market has functioned.

A number of British firms have agreements with their Continental counterparts but this will be rapidly overtaken by the number of new agreements that can be expected during the months of negotiation and after the formal admission of new members to the Common Market.

Almost by common agreement the small firm is consigned to a rough passage while the big industrial empires more easily adapt themselves to the changes the new trading system, if it is finally set up, will bring.

In the event the small firm that is quick off the mark and has directors travelling in Europe may do well from the changes by judiciously making the right agreements in Europe.

Finally, for British industry finding Europe increasingly part of its home market there are two courses of action urgently needed. One by the organisations of industry as a body, the other by individual companies.

The first is a sustained and widespread advertising campaign to convert "the rest of Europe" to a belief in the seriousness of our trading intentions; this must be through all media, and especially films.

The second is the recognition that we do not have enough trained salesmen and action to remedy the situation, multiplying our sales force in Europe several times over.

'Send your own men'

PITFALLS likely to be encountered by firms seeking to take advantage of Britain's inclusion in the Common Market were listed in Leeds last week by Mr. R. S. Thompson, a management consultant, during a two-day conference for industrial sales-directors and executives.

Markets would have to be studied—preferably at first hand, by representatives of the firms concerned. Too many firms were more concerned with selling their products than with selling their firms.

Adequate projection of "the company image" was too often overlooked in sales-training programmes.

"This is one of our problems in export-selling," he said. "We work over-much through agents. One of your own men is worth a dozen of someone else's."

Firms, too, would be well advised not to indulge in expensive advertising in Europe without knowing market conditions.

Proper training in salesmanship was essential, for a bad salesman could cost his firm "staggering" losses.

Common Market springboard

ENGINEERING NEWS presents a list of addresses for manufacturers who wish to make contacts inside the Common Market.

Companies wishing to make a start in the French market will find the commercial section of the British Embassy extremely helpful. Address — 35 Rue de Faubourg, Paris 8.

Well-equipped with commercial officers in the north, the British Embassy in Rome (the Villa Walkonski, Via Conte Rosso, 25 Rome) is a good starting point for companies making a first approach.

A useful first call for any company intending to market or manufacture in Belgium and Luxembourg would be at the British Embassy, 2 Rue de Spa, Brussels.

The British Embassy in Bonn, at 22(c) Friederick Ebert Allee, is particularly well informed on developments in German industry and is a most useful springboard for first inquiries.

The Anglo-Dutch Trade Council, at Raamweg 45, The Hague, provides valuable services of contact and information for its members. A valuable source of local knowledge and assistance is the Commercial Section of the British Embassy at Lange, Voorhout 32, The Hague.

QUOTE

SIR HENRY SPURRIER, chairman of the Leyland vehicle group:

"Insofar as Leyland is concerned, and our associated companies, we are of the opinion that the U.K. cannot afford not to belong to the Common Market, bearing in mind that it has a potential of some 200 million people and that it is an expanding and vigorous economy which is likely to be the equal of that of the United States of America.

"At the same time, we feel that prior to actually becoming a member of the Common Market, the British Government must be in a position to negotiate reasonable terms and that we must give full consideration to the long established, profitable trading conditions which at present exist between this country and the Commonwealth countries and in which the commercial vehicle industry, in particular, has been so successful.

"We readily accept the challenge offered by the European Common Market as we are convinced that, given equal opportunities, our company can compete with any European manufacturer in existence today.

"If we do not join the Common Market, we feel that a great competitive stimulus will be removed from our industry which, we think, in the long run will do it good. We must bear in mind that many Commonwealth countries today are gradually developing their own manufacturing industries which, in the ultimate, must restrict the imports which they can accept from this country."

QUOTE

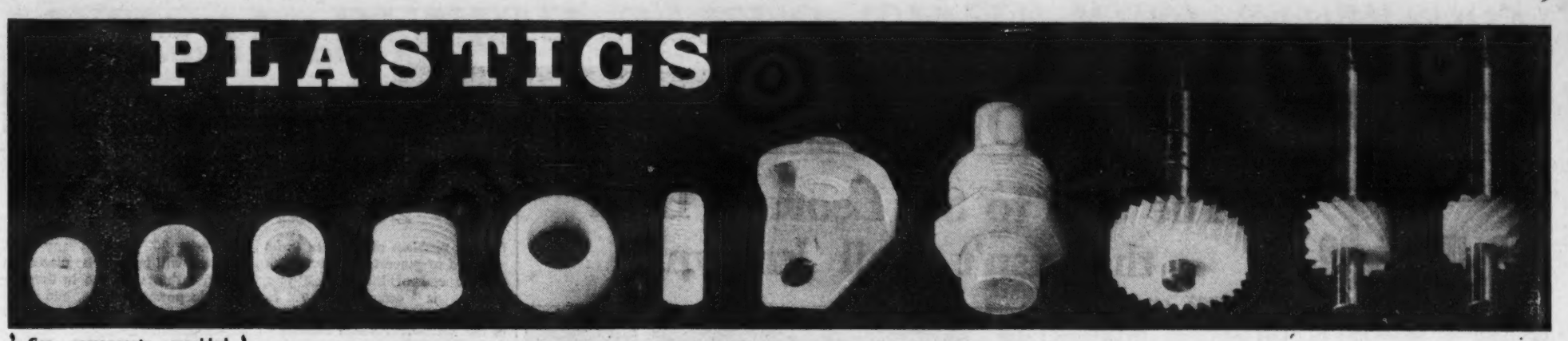
SPOKESMAN for David Brown Industries:

"With the high level of industrial activity within the Common Market there is an increasing demand for all types of gear products.

"Although domestic manufacture is at a high level, there exist good opportunities in the Common Market for certain specialised, high quality, industrial gears which are not manufactured as extensively elsewhere as they are in the U.K., hence there is an expanding market for some of our products.

"The British gear industry is very well established in the home market and well-established in the export market, too, due to the fact that many gear products made to home orders find their way into products for export. The fresh winds of Continental manufacturers competing for this sizable market will offer, not a threat but a further challenge to improve our overall efficiency."

PLASTICS



Car components moulded from "Maranyl" nylon compound from left: thrust button, shroud, split bush, plug, spherical bush, stem, bracket, bush, speedo pinions.

HARSH WORDS—but they are true

OUR ENGINEERS AND DESIGNERS LACK DRIVE AND IMAGINATION

by

Dr. C. L. Child

Head of Information Services Division, ICI PLASTICS

DURING 1960 the British Plastics industry produced over 600,000 tons of plastics raw materials.

Compared with the production of iron and steel at something like 24 million tons during the same period, this may seem an insignificant quantity.

But when account is taken of the difference in density between steel and plastics the production of the latter appears somewhat more imposing, as the volume of the plastics is no less than one-seventh that of steel.

The value of this quantity of plastics—at something over £130 million—is another measure of the importance of the plastics industry.

Rapid expansion

Perhaps the most striking fact about the plastics industry is its rate of growth which, over the last few years, has been running at the rate of something like 14 per cent per annum—a rate exceeding that of any other industry in the country except perhaps pharmaceutical chemicals.

The proportion of plastics used each year which goes into engineering applications is not known exactly, but, excluding electrical engineering, it is probably less than ½ per cent, and it is suggested that there are three reasons for this.

First, the physical and processing properties of plastics make many of them ideally suited to non-engineering uses.

Too conservative

Examples of this are the use of calendered p.v.c. sheeting for curtains and raincoats, and the dominance of polythene in well over a hundred domestic uses.

This technical and economic suitability of plastics for non-engineering uses has readily opened the doors to vast markets for them.

The second reason why engineers make small use of plastics "or stated as the ignorance, lack of imagination, and conservative engineering purposes is in some sense another aspect of the f st, and it is that the properties of many plastics do not obviously and readily make them suitable for engineering purposes.

This is particularly true as regards the relatively low stiffness and the relatively low upper service temperature limit for most of them, for it is because thermoplastics soften easily under heat and have low stiffness (that is high flexibility) that they are suitable for many everyday uses.

The third reason for the small utilisation of plastics in engineering applications may, more provocatively but with justice, be nature of many engineers and designers. These may appear to be harsh words, needing explanation.

Inadequate training

Even today, engineers during their training, receive either no instruction about plastics, or at best just a few lectures without practical work on the whole vast subject.

Here and there, engineers — unfortunately too often because of pressure from a management which has become captivated by the glamour of the word "plastics" —gaily ask the plastics industry to recommend a plastics material to replace some conventional material in a component which has been made for many years in an unchanged form, **to an unchanged drawing.**

At the same time they stress that the design, dimensions and tolerances must not be changed. The plastics technologist advising his engineering friend usually, in the end, has to produce a "Chinese copy" of the original non-plastics article.

Changes in design

While it is true that it is often commercially necessary to introduce changes in design in gradual steps, it is none the less technically and economically nonsense not to take full advantage of the particular processing characteristics and properties which a new material offers. One might perhaps make a plea for the wider recognition of what might be called "economy of design".

A Sturtevant/Acalor No. 9 BAVA centrifugal fan fabricated from 'Darvic' p.v.c. sheet. This is one of a wide range of p.v.c. fans jointly offered by Acalor (1948), Crawley, Sussex, and Sturtevant Engineering Co., London, E.C.4.

This ideally means that the material chosen for any part has the necessary properties for the job with an adequate but not absurd safety margin, that none of its properties is unused, and that full advantage is taken of the design possibilities offered by the processing methods.

Common fallacy

A common form of conservatism on the part of engineers and designers was encountered when the first attempts were made to introduce nylon for light duty gears.

Engineers, used to working with metals, immediately pointed out that nylon had neither the strength nor the stiffness of metals and therefore could not be expected to do the job.

They considered individual properties in isolation rather than as parts of a whole and so failed to see that the lack of rigidity makes up for the lack of strength as, instead of the load being exerted over a small area as happens with rigid metals, the same total load is distributed (because of the flexibility of the nylon) over a much wider area, so reducing the effective working pressure.

Fortunately, there were some imaginative engineers who were not too conservative and who were willing "to suck it and see".

It is in the civil and mechanical engineering fields that the least impact has yet been made by plastics and it is probable that here, because of their low stiffness and the temperature dependence of their properties, plastics will not find very wide use on their own.

A newly discovered material may well change this state of affairs, for it would be a rash man who would predict what properties the plastics that will be discovered tomorrow will have.

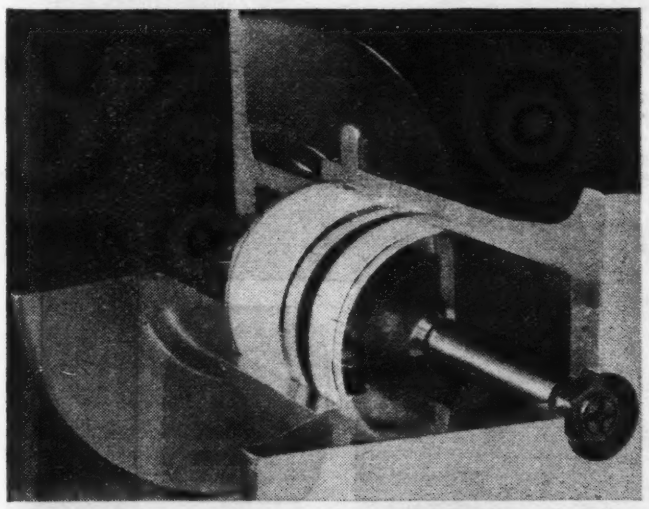
There is, however, another line of approach which engineers should watch closely and that is the combination of plastics with other materials such as metals.

The future

Already, steel clad with p.v.c as an adherent coating is being more and more widely used, because it offers the engineer the strength and heat resistance of steel allied to the chemical resistance and self-colour of p.v.c.

The mechanical engineer would also do well to remember the porous metal bearing impregnated with p.t.f.e. which offers strength, heat conductivity, dimensional stability, and very low coefficients of friction.

Plastics offer such interesting combinations of properties and, between them cover such a wide range, that it is certain that, as knowledge and experience of them grow, the engineer will develop many, many more uses for them in the future.



Section of railway buffer made by Oleo Pneumatics, Kenilworth, showing "Maranyl" nylon bearings and seals. Projection, 18 inches; stroke, 4½ inches; weight, 60 lb.; maximum resistance 100 tons.

Should Britain go metric?

THE British Association recently carried out an inquiry into the costs and implications of Great Britain adopting the metric system.

Next week, Engineering News will present an article by Group Captain Edwin Shipley, who served as Engineer Technical Officer to the investigating committee, and who is well qualified to give his personal opinions on findings of the committee.

£7m. ORDER FOR TWO SAHARA GAS SHIPS

ALTHOUGH the decision to import methane gas from the Sahara has upset the coal industry, at least one benefit will be an order worth £7 million for two specially designed tankers.

The two ships, of about 28,000 tons each, will be built by Vickers-Armstrongs, Barrow and Harland and Wolff, Belfast.

These firms have been chosen because of their experience in aluminium welding, heavy lifting equipment available and research facilities.

Initial research into the most suitable type of insulation has been undertaken. This is extremely important as each vessel will carry about 12,000 tons of liquified gas at — 258 deg. F.

Storage tanks and regasification plant are to be erected on Canvey Island and 18-in. pipelines will be laid to at least seven of the Area Gas Boards.

The scheme is expected to come into operation in about 2½ years time and the distribution will represent about one-tenth of total gas supplies.

dozens of **nuts** at a time

with Thor Multi-Spindle Units

Skill, *says Tommy Thor,* is passed from hand to hand, generation after generation. Thor Power Tool engineers have put it slap into the hands of everybody in industry. Today any operative can tighten nuts by the dozen. Thor Multi-spindle units can incorporate screwdrivers, studsetters, drills or impact wrenches. The latter are equally useful for dismantling.

Thor POWER TOOLS

THOR TOOLS LTD

NEW COMPANY NAME OF ARMSTRONG WHITWORTH & COMPANY (PNEUMATIC TOOLS) LTD
Main Sales Office: 34 Victoria St., Westminster, London, S.W.1.
Cables Address: Thortools, Sowest, London. Tel: ABB 3817
Factory: Tynemouth, England. Tel: North Shields 3111.
Grams & Cables: Thortools, Tynemouth.
R 63
P 7081

ENGINEERING NEWS

Published by Heywood & Co. Ltd., Drury House, Russell Street, London, W.C.2. Phone: Temple Bar 3422. Grams: Organigram London, W.C.2.

Thursday, November 9, 1961

We must be ready

THERE is something inherently fascinating about new sources of electric power. At a time when protagonists of coal and oil are locked in combat over future economics many engineers are watching with interest the progress of nuclear power, fuel cells and magnetohydrodynamic (MHD) generators.

Technically, the possibilities are almost unlimited, but the great question is, will these newer devices ever be economically attractive, and if so, when?

The announcement last week that another great petroleum group, B.P., has joined in the fuel cell race suggests that an economic device is more than wishful thinking by scientists.

Shell and Esso have been on fuel cell research for some time.

*

In fact there are now known to be at least 80 laboratories working on fuel cells or closely associated problems. Most of these are in the U.S., but at least two laboratories are known to be active in Russia, six in England, three in Germany and one in Canada.

It will be surprising if this enormous effort does not yield some practical and useful results soon.

MHD is not so easy to assess as there are still many technical problems unsolved, but now that an a.c. generator is feasible many engineers feel that the ultimate solution to direct generation of electricity lies in this direction.

*

These developments are fascinating to watch, but engineers should not merely be satisfied as spectators.

Transistors and printed circuits revolutionised the electronics industry in a very short space of time, and thermoelectric devices are already threatening the traditional methods of refrigeration.

If new power sources become a practical proposition within the next few years, we must be ready for them and this means a redesign of power stations, aircraft and cars. Active redevelopment should start now.

Tomorrow's technology

A CONTINUOUS - CONVEYER operated laundry plant that washes, rinses, and dries cloth in less than ten seconds has been developed in the form of a special plant by the Stanford Research Institute of California.

Equipment for carrying out this process will soon be available on the American market.

The change from the present batch process to the continuous plant is expected to show savings in labour costs, administration and water, as well as in capital equipment such as water treatment plant.

Machines are at present being designed to operate up to 150 feet per minute, which amounts to one bed sheet every 6-8 seconds. — SCANNER

an Engineer's DIARY

THE GOOD SAMARITAN

The side to Sir Leonard Lord that isn't well known

RETIRING executive chairman of B.M.C. Sir Leonard Lord is a man noted for his boundless energy, brilliant foresight, and incisive mind.

Our picture (right), showing him in the toy car factory he established in 1947 to employ ex-miners suffering from pneumoconiosis, emphasises a characteristic which he does not like publicised—the help he affords the sick and unfortunate.

Sir Leonard has spent 40 years in the car industry and played a prominent part in the establishment of the British Motor Corporation as the fourth largest car manufacturer in the world.

TIME: 1953. PLACE: Austin Junior Car Factory at Bargoed, in Glamorgan Sir Leonard Lord (right) shows Sir Walter Monckton, now Lord Monckton, who was then Minister of Labour, around the factory. Sir Leopard started the works in 1947 to employ ex-miners suffering from pneumoconiosis.

Great ability

In 1921, he joined the Hotchkiss Engine Co., soon after acquired by Lord Nuffield.

His ability earned him continual promotion and after reorganising Wolseley Motors he became managing director of Morris Motors.

A year before the second world war he accepted Lord Austin's invitation to become works director of the Austin Motor Co.

During the war he was responsible for the production of the Defiant night fighters.

In 1945, he became the chairman and managing director of the Austin organisation and this led to the eventual amalgamation with the Morris organisation.

As a non-executive director, his colleagues will still have his interest and encouragement in their efforts.

Short answer

A FRIEND of mine who is a senior engineer with one of our large electrical companies was recently making some scathing comments about the central research department of his group.

"They cannot give you a simple answer to anything," he said. His main complaint was that the research attitude is to write a book about every problem it tackles. Naturally this takes time, and even when it is finished no-one bothers to read it.

I cannot help feeling that all research engineers should receive some training in technical journalism. This might go a long way towards meeting my friend's difficulty, because editorial staff are trained to cut out all irrevelant matter.

I know this to my cost. Articles which I have written for the technical press have been slashed ruthlessly, but I must confess that the final result has usually been very satisfactory. An editor once told me that all contributions can be improved by cutting—I am sure he is right!

Round trip

FEW people are able to celebrate their 50th birthday by taking a trip round the world. This is what Mr. R. D. Wasserman, chairman, is doing.

On November 4 he started his tour which will take him to five continents inspecting the business he has built up during his lifetime.

At the age of 29 he went to New York from Switzerland to exploit welding processes made prominent in Europe by the name of Castolia.

He founded an affiliated company, Eutectic, and proceeded to expand it across that continent. Today, 70 per cent of the turnover of a worldwide organisation results from products conceived, developed and marketed by him personally.

Rene D. Wasserman has achieved much in his life and we wish him a happy and satisfying trip.

Flush business!

NOT long ago I bumped into an old friend, H. C. De Vroome who just over ten years ago set out on what was thought by many of his colleagues to be a risky and foolhardy enterprise.

"D.V." as many people in the electrical industry know him, was formerly with a large paint firm as a specialist in electrical varnishes.

Now he runs his own company, Devroome Developments and sells not only electrical varnishes but all the technique and know-how as well, including an engineering service for the plant needed in the production and testing of varnish impregnated equipment.

D.V. calls this the "packaged deal" approach and his success can be gauged from the fact that over 50 per cent of his business is export.

Much of his effort is directed to the Scandinavian countries, Finland, and Poland. A difficulty with iron curtain countries is their lack of Sterling and D.V. told me that if only he was prepared to accept 80,000 flush doors he could have increased his business with Poland!

Note to the Duke

MR. Robert Redmond, head of a Wigan firm of electrical contractors, who is "fed up with the distorted image of British industry which is harming our reputation overseas," has written to the Duke of Edinburgh about his "take your finger out" speech on our export industry.

"I seem to have stirred up a hornet's nest with my criticism, but I have also had a lot of support," Mr. Redmond, who lives at Alderley Edge, told me.

"Reports in the press and on radio and television suggested that every British product was old-fashioned, badly designed, overpriced, and invariably delivered late.

"That is not true. This kind of publicity does us a lot of harm. Nobody would think that British industry and brains have led the world with radar, electronics, and a host of other developments," he added.

"Many of our manufacturers are ahead of European competitors in every way. Specious criticism discourages those who are trying hard.

"I was surprised that the Duke should allow himself to be taken out of context in regard to some widely quoted advice to industry in what was really a well-balanced speech, so I have written to him."

John Heywood

SOVIET ENGINEERING

by our own correspondent

Steam turbines to stay for 20 years at least

THE problem of turbines to be used to generate 3 billion kWh by the end of the next 20-year period is discussed by L. Shubenko-Shubin, chief designer of the Kharkov Turbine Plant and a delegate to the recent 22nd Communist Party Congress, in an article in the Economic Gazette.

Mr. Krushchev in his report to the Congress had mentioned that projects for turbines up to 500,000 kW were being prepared as part of the endeavour, to build the most powerful system in the world.

He first dismisses the methods involving the direct conversion of other forms of energy into electricity with the remark that they will have no noticeable effect on the generation of electrical power within the given period.

* * *

According to him, even the most potentially fruitful of these methods — the magnetohydrodynamic—is still undergoing its first laboratory trials.

The conclusion is simply that, "by the end of the 20-year period electric power will be generated mainly by hydraulic turbines at hydro-electric stations and steam and gas turbines at thermo-electric power stations".

The gas turbine, however, has too many disadvantages associated with it; it appears that last year the Kharkov Turbine Plant built a gas turbine of 50 thousand kW which is claimed to be the most powerful in the world but even this is inadequate because, "only a gas turbine of several hundred thousand kilowatt power can have a substantial effect on the production of electric power in the USSR".

the next 20 years at any rate, reliance will have to be placed on steam turbines for use in thermo-electric power stations, and these must undergo further technical development.

The final conclusion is that for Efforts in this direction are in full swing. In 1960 the Kharkov and Leningrad Turbine Factories designed a single shaft unit of 500,000 kW power, and a double shaft unit of 800,000 kW for operation with steam at a pressure of 240 atmospheres and temperature of 580° C.

The reason for the choice of such units is an economic one. The floor space required for an 800,000 kW turbine is half that for an aggregate of 300,000 kW.

The hold-up in the use of such turbines is due to failures on the planning and organisational side of the industry, and this is incidentally becoming a feature of current Soviet development.

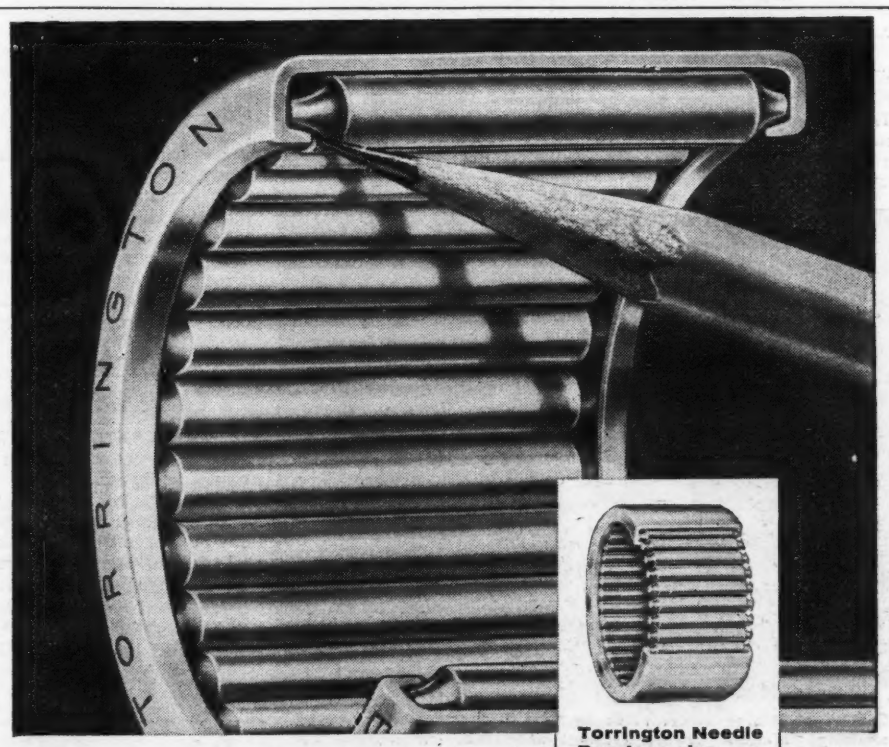
In this case it is the State Committee for Automation and Machine Building which comes in for criticism for not having examined the plans which have been worked out.

To secure a further economy, Mr. Shubenko-Shubin proposes the use of austenitic steels for the heat units of the power stations.

* * *

A new and small simple mechanism called an "auto-strop" or perhaps better in English an "autosling", has been built by the Central Scientific Research Institute of the Ministry of Transport.

It mechanises the loading and unloading of containers on railways and will release some ten thousand workers.



This little lip makes a big difference!

The turned-in lips of the Torrington Needle Bearing not only retain the rolling elements making the bearing a truly complete unit, they also provide against the loss of lubrication.
The closely controlled clearance between cup lips and shaft form an effective labyrinth seal which facilitates pregreasing before assembly.
Long experience in thousands of applications has proved the merit of this and other features of the Torrington Needle Bearing.
Make sure your product benefits from the best that experience has to offer—specify Torrington Needle Bearings.

THE TORRINGTON COMPANY LTD

Bearings Division: Torrington Avenue, Coventry. London & Export Office: 7-10 Eldon St., EC2. Glasgow Office: 50 Wellington St., C2

Torrington Needle Bearings give you these benefits

- *High radial load capacity*
- *Low co-efficient of starting and running friction*
- *Low unit cost*
- *Long service life*

B.58/G

THE SECOND Engineering Materials and Design EXHIBITION and CONFERENCE

STAND No. F6

EARLS COURT 13th-18th NOVEMBER 1961

OPTICAL DEVICE SAVES TIME

High-accuracy method measures machine errors

AN optical apparatus for the detection of alignment errors to an accuracy of 0.00005 in. over a range of 20 ft. by means of a circular diffraction grating has been developed by the AEI Research Laboratory, Aldermaston.

Called the Rodolite, derived from "rod of light", this apparatus is to be placed on the market shortly by Cooke, Troughton & Simms. Two versions of the instrument are available.

The detection of errors in machine tools and in certain other engineering applications often involves the setting up of a reference axis from which measurements can be made.

The Rodolite makes use of a circular diffraction grating to define an optical straight line by a method of looking down a conical pattern of concentric interference rings.

By using a transmission grating in conjunction with a mercury pool it is also possible to define a line which is both straight and vertical.

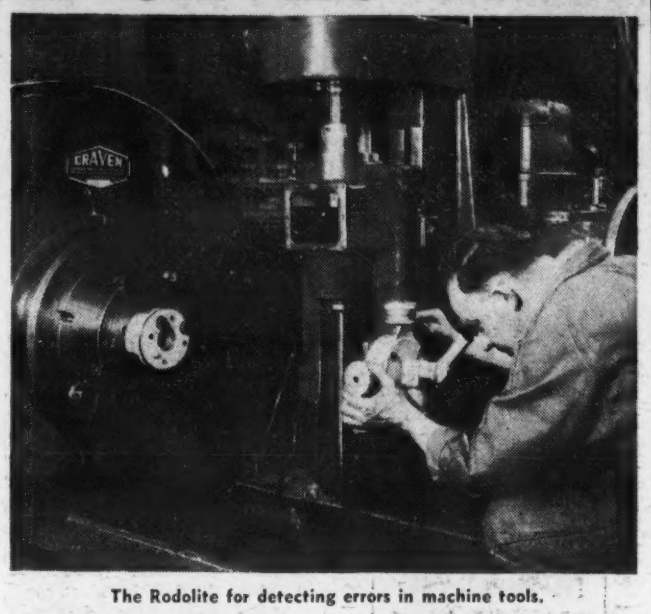
Rotational errors

A machine tool saddle moving along the machine has six potential degrees of freedom of movement, of which five must be restricted to obtain a perfect rectilinear motion.

All five unwanted movements can be measured with this equipment, and rotational errors to a half second of arc can be detected.

One of the more important applications in the machine tool industry is in connection with gear hobbing machines where if the saddle motion is not parallel then for instance with a double helical gear, one helix would be cut with too great an angle and the other with an angle too small.

When put in mesh with its pinion such a gear would be subject to uneven loading and would be susceptible to all the troubles arising from "hard bedding".



The Rodolite for detecting errors in machine tools.

Breakdown increase on M.1

FIGURES released by the Automobile Association on November 2, the second anniversary of the opening of the M.1 London - Birmingham Motorway, show that over 27,800 vehicles have broken down on the M.1.

Breakdown calls to the Automobile Association's Motorway Control centre near Newport Pagnell in the year ending at midnight November 1 totalled 14,245. This compares with 13,579 during the first year of use.

An A.A. spokesman said, "Although the total for the two years show a difference on only 666, there have been increases in some of the individual causes.

Fan belts

"The most noticeable is the rise of over 65 per cent in the number of vehicles which came to a halt with fan-belt trouble. The figures of 985 for the first year compares with 1,638 for the second year."

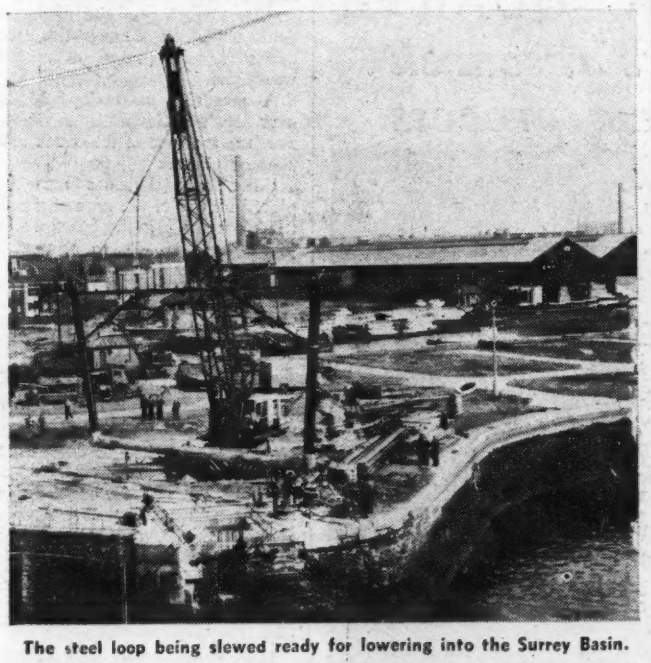
The highest number of calls was again accounted for by drivers running out of petrol or oil — 1,658 compared with 1,377.

Wheel changes and punctures resulted in 1,438 calls (1,406), electrical trouble 1,436 (1,328) and big-end failure 1,121 (862).

TAKE CARE

There is no place in a steelworks for the "couldn't care less" type, says a booklet published this week for school-leavers. It is "Iron and Steel", a 2s. 6d. illustrated booklet in the "Choice of Careers" series, issued by the Central Youth Employment Executive.

Underwater gas main is laid in Surrey Docks



The steel loop being slewed ready for lowering into the Surrey Basin.

TO obtain an adequate gas supply from the Rotherhithe holder to the Surrey Docks the South Eastern Gas Board's Metropolitan Distribution Department has laid an 18 in. main across one of the entrances to them.

A survey of the site had shown that close beside the inner lock gates there were recesses in the dock walls on both sides where a cassion had been housed.

It was decided to reroute the 18 in. main from Rotherhithe to cross the basin at this point.

An 18 in. steel loop, about 60 ft. long and 30 deep was fabricated on site, with a 24 in. "blister" at one end to form a syphon.

The total weight with all protective measures applied was about nine tons and the largest mobile crane in the country, the Lorain 65, was used to lift it.

Positioning the loop was completed in three hours and it is connected to the shore by insulated Johnson couplings. Valves have been inserted so that it can be isolated if necessary.

MTIRA INFORMATION SERVICE IN ACTION WITHIN FOUR MONTHS

THE recently formed Machine Tool Industry Research Association has inaugurated an information service which will deal with technical inquiries from its members.

If necessary, experts outside the Association will be consulted to provide answers.

Members will be able to borrow books, periodicals or photocopies of literature from the library.

A translation service will be available for translating from foreign technical literature.

Joint research

The MTIRA is a government-aided co-operative research association that was set up at 28 Deansgate, Manchester 3, in June this year to serve the machine tool industry by pursuing and applying scientific knowledge in this field.

Having no laboratories of its own, the organisation makes use of existing facilities for machine tool research in universities, colleges of technology, government laboratories, and other research associations.

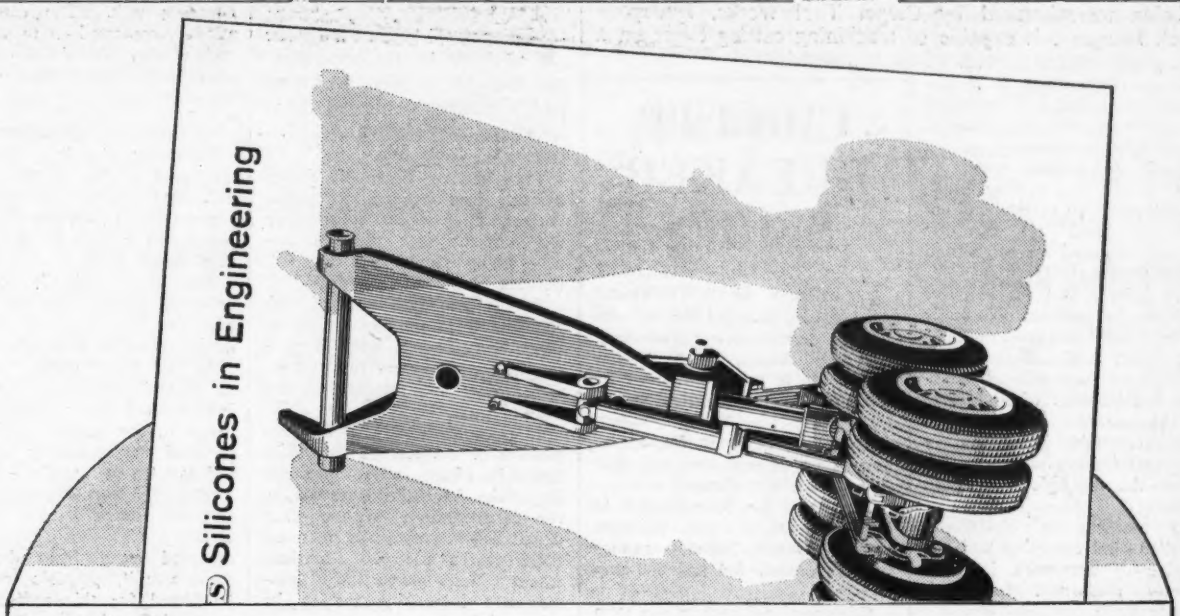
Unit studies hospital engineering

PROBLEMS in the design of hospital engineering services are to be studied by a Hospital Engineering Research Unit, set up by the Nuffield Provincial Hospitals Trust and Glasgow University.

Surveys carried out show that little thought was given at the design stage to the maintenance of services.

Heating and ventilating of wards and operating theatres is also inefficient.

Data is now being collected, to form the basis of the services required in specific departments.



THE LATEST FROM MS

This new booklet gives you numerous examples of how MS Silicones are being used in engineering and allied industries—case histories, production techniques and a wide range of illustrations from current industrial practice where MS Silicones have cut manufacturing and design costs, as well as improving operational reliability.

Send for 'SILICONES IN ENGINEERING'
—you'll find things in this booklet you'll want to know more about
Write for 'MS News'
—it contains the latest news about all MS products
See MS Silicones
—on stand C4 at the Engineering Materials and Design Exhibition

MS Silicones offer you this unique combination of properties

- Resistance to extremes of temperature
- Water repellency
- Chemical inertness
- Excellent electrical properties
- Adhesion resistance

MS MIDLAND SILICONES LTD

first in British Silicones

(Associated with Albright & Wilson Ltd. and Dow Corning Corporation)
68 Knightsbridge, London, SW1 Telephone Knightsbridge 7801
Area Sales Offices: Birmingham, Glasgow, Leeds, London, Manchester
Agents in many countries

Please send me:
1. a copy of 'Silicones in Engineering' ☐
2. a copy of the latest 'MS News' ☐
(and put me on the mailing list)

Name .....
Company .....
Address .....
E7

.....FOREIGN NEWS.....FROM OUR OWN CORRESPONDENTS....

AUTOMATIC MILLING MACHINES CUT EDGES IN 15 SEC.

BUDAPEST

A FULLY automatic rotary-table transfer milling machine being manufactured by Csepel Tool Works, Budapest-Csepel, Hungary, is capable of machining cutting edges on a single-point cutting tool in 15 to 35 seconds.

The six-stage rotary table has five milling units, each mounted on a traversing slide and operated hydraulically according to a previously programmed cycle.

Two of the five milling heads are equipped with vertical milling attachments and all can be separately adjusted for height and angular position.

It is claimed that the machine is suitable for milling tools made from both solid tool steel or high-speed steel, and changing of machined and unmachined workpieces can be done without stopping the machine.

The rotary table is operated by an internal Geneva motion which indexes the workpiece at each station.

The machine is electrically controlled, and clamping and unclamping of the work is automatically performed for each complete cycle.

Magnetic crack detector

BONN

AFTER trials extending over a period of years in a number of leading West German forges, Karl Deutsch have placed a new magnetic crack detector on the market.

The detector represents an improvement on the methods previously employed for detecting cracks in forgings, both in reliability and cost; mass-produced components can be tested satisfactorily and quickly.

Characteristic feature of the apparatus is a "whirlpool" drum in which dry iron powder is floated by means of suitably arranged compressed-air inlets.

A premagnetised test-piece is dipped into the powder as if into a liquid and the stray magnetic field which is concentrated at any cracks attracts a fringe of powder.

Under ultra-violet light the fringe fluoresces and can be distinguished at once.

JAPAN — U.S. LINK

Plans for the export of Leonite galvanised sheet and coil produced by the latest Sendzimir continuous process are shortly to be announced by the Japan Steel & Tube Corporation. The new method is being used under a technical aid agreement with the Armco Steel Corporation of the U.S.

CIRCUIT BREAKER SERIES

PRAGUE

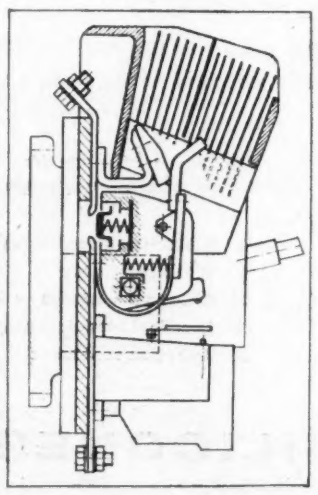
A SERIES of AMT circuit breakers intended for use with motors, transformers, generators, capacitor banks, and similar equipment is being produced by the Czechoslovak electrical industry.

These are designed for operation in a.c. systems, but may also be used for d.c. circuits.

The series has been divided to form two basic types, the first covers 100 and 200-amp ratings and the second 400 and 600-amp ratings.

Cross-sectional area of the strip and the size of incoming terminals are designed to suit each basic type, all remaining components are common to each size.

Interrupting capacity of the 100 and 200-amp breakers is 15 kA a.c. at 500 volts and 0.5 pF.



Cross-section of a one-pole AMT circuit breaker.

The 400 and 600-amp units have a capacity of 25 kA under the same conditions. Interrupting capacity of these units in d.c. circuits is approximately 10 kA d.c. at 500 volts.

Breakers are assembled from individual sub-assemblies which may be mounted independently.

The circuit breakers are fitted with a lever-type double-contact assembly. Main contacts carry the curent after closure of the circuit breaker and arcing contacts are fitted for interruption of the circuit and breaking the full short-circuit current.

ITALIANS BUILD VALVE PUMP

Makers say it may be used to raise oil or to dredge harbours

MILAN

AN interesting compressor-operated pneumatic pump suitable for raising liquids from great depths has been built and patented by the Societa Italiana Ricerche Sfruttamenti Idrici, of Florence, Italy. The makers say the pump may be used for raising oil from deep wells, and dredging mud deposits in harbours.

Known as the "Pneuma" pump, it is free of rotating parts, and consists of three pressurised chambers fitted with valves.

These valves are the only moving parts in the pump, their movement being automatically controlled by the air pressure within the chambers.

A compressor and distributor form the other components of the pumping unit. The distributor allows compressed air to pass into each of the chambers in sequence, promoting a continuous flow of liquid.

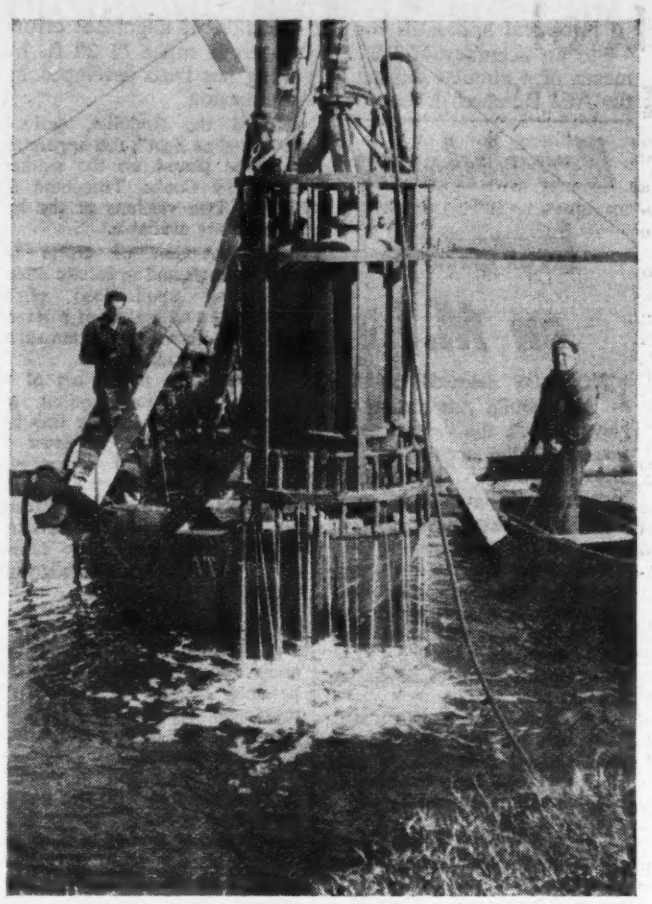
Pressure difference

Pump capacity is governed by the speed of the distributor and difference between internal air and external liquid pressure. The pump can operate in an open or semi-closed cycle.

The open cycle is used for pumping liquids with abrasive or corrosive properties and "worked" air is vented to atmosphere.

In the other cycle, "worked" air is recirculated and a valve is incorporated to compensate for losses in the system. This cycle is used for pumping at great depths with increased efficiency.

The pump will operate from any compressor having sufficient capacity. As the pump can be operated away from the compressor unit, possible uses will be found for this equipment to handle inflamable liquids.



MAGNETIC OIL FILTER IMPROVED

ESSEN

THE normal type of magnetic oil filter, in which oil flowing through a pipe is forced past a magnetic core, has been improved by Stelzner and Co., Essen, W. Germany.

The Mikro-S-Filter developed by this firm employs a coarse-meshed filter drum surrounding the magnetic core, the combination being situated in a small housing in the oil line.

Eddies in the flow of oil, resulting from the presence of the filter, bring ferrous metal impurities in the oil nearer to the core, where they are retained in the normal way.

It has been found that the proportion of non-ferrous impurities trapped along with magnetic impurities has been increased by the incorporation of the filter drum; this new magnetic filter can therefore be used in situations where a larger proportion of non-magnetic impurities are to be expected in the oil.

U.S. PURIFY DOMESTIC QUARTZ

Eight years research perfects new process

NEW YORK

AN "ultra-pure" fused quartz, the first to be made in the U.S. from domestic raw materials, has been developed by the General Electric Co. Quartz tubing and rod is now being made by the lamp glass department.

Eight years of research and development went into perfecting the new process of purifying the raw material (silicon dioxide) which is available domestically. Previously all silicon dioxide used for fused quartz production had to be imported, the only known sources of reliable quality being in Brazil and Madagascar.

The new high-purity fused quartz will be particularly beneficial to the nation's research and development laboratories where, in many cases, even the smallest trace of impurities presents a problem.

Higher temperature

The semiconductor industry will also benefit from a much lower content of alumina and boron, previously a major problem in the manufacture of transistors.

Because of its high purity, the new quartz is claimed to have higher thermal resistance, enabling it to withstand high temperatures for longer periods of time.

Tests show that the new material will deform at less than one-half the rate of the former quartz when subjected to temperatures of 1,200 deg. C.

Heat-resistance of "ultra-pure" fused quartz is demonstrated above. Flame from the torch causes the tube made of imported materials to sag sharply, while that made of domestic quartz is less affected.

Dutch firm develop magnetic chucks

THE HAGUE

MAGNETIC chucks utilizing high flux density ceramic magnets have been developed in the Netherlands. The manufacturers, Hagou N.V., Eindhoven, state that these magnets are made from barium-oxide and ferro-oxide and can be magnetized in their shortest direction to give a tightly compressed field.

North and south poles contact the top plate of the chuck and are arranged alternately so that the regular changing of the magnetic field tends to demagnetise the cutter as it passes over the workpiece.

A powerful magnetic field of over 16,800 Gauss is available over the top face of the chuck and adaptor plates.

Finer pole divisions may be placed on top of the normal chuck top plate for grinding steel workpieces less than 10mm. square.

CARBIDE CUTS DIE COSTS

CHICAGO

CONSIDERABLE cost reductions are reported by an American manufacturer, Arnold Schwinn & Co. of Chicago, who has been using coining dies made from Ferro-Tic C, a carbide material which can be machined by conventional methods in the annealed state.

High carbon, high chrome dies had only coined about 20,000 of the parts before polishing was necessary, and the dies had to be scrapped after being reconditioned four or five times, compared with 100,000 parts from the carbide dies before polishing. Dimensional stability was also improved.

Ferro-Tic C is produced by the Sintercast Division of the Chromalloy Corporation of New York. It consists of titanium carbide particles embedded in a tool steel matrix and can be hardened to Rockwell C.71 using normal heat treatment procedures.

NEW Equipment

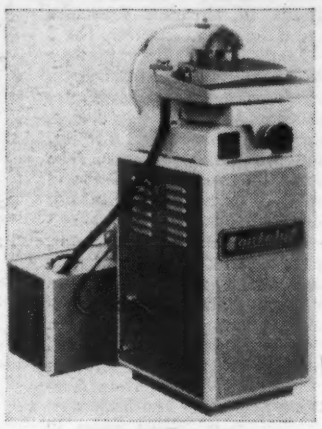
Electro-chemical tool grinder range

ELECTRO - CHEMICAL sharpening of carbide tools and machining this and other difficult alloys is the purpose of the Contelyt, Swiss-built, range of machines, recently introduced into the U.K.

This process offers a saving of 80 to 90 per cent wheel wear against conventional diamond grinding wheels and metal removal capacity is increased eightfold over conventional methods. The automatic, voltage-controlled generator provides the current and with 80/100 amp output, 100 cu. mm. of material are removed in one minute from an area of 1 sq. cm. This amount can be increased with a higher generator output. Two advantages claimed are, no heating up and a surface finish of around 10 micro-inches.

At present there are three machines available: the Cadet, for tipped tools up to 1½in. high, the PH 175 production machine for batch grinding of carbide inserts and tipped tools up to 2½in. high and the PV 23, a production machine with duplex rotary tables for batch machining of carbide inserts and similar components. Other standard models are being prepared and special machines can be built to customers' requirements. Also available are Contelyt conversions for many conventional machines. **SOAG Machine Tools Ltd., Juxon St., Lambeth, London, S.E.11.**

Reader service reference No. 184



TOOL GRINDER
Gives high surface finish

Helmets with vizors

Two models of safety helmet—peak style or full brimmed type—are now available with attached face shields. The shields are made from cellulose acetate 0.060 in. or 0.080 in. thick and 8 in. deep, and are attached to swivelling top bands of vulcanised fibre by means of bayonet slot fittings designed to prevent accidental removal.

The peak-type helmets can be either of plastic or glass fibre but the full brimmed hats are available in plastic only. **Safety Products Ltd., Holmethorpe Avenue, Redhill, Surrey.**

Reader service reference No. 185

Telephone timer

This device has been designed primarily with Subscriber Trunk-Dialling in mind as it will record the time of a call, give a three-minute reminder ring and indicate

TELEPHONE TIMER
Shows cost of call

the cost according to the rate due, up to a maximum time of 15 minutes.

In operation, the caller flicks a switch at the moment of connection, switches off at the end of the call and the cost can be read from the four part dial before zeroing the instrument for the next call. It is supplied either in white with a black dial or black with a matching dial. **Smiths Clocks and Watches Ltd., Sectric House, Waterloo Road, Cricklewood, London, N.W.2.**

Reader service reference No. 186

Thread grinder

Produced for accurate grinding on quantity production of a wide range of nuts and half nuts of ball track and other forms, the Matrix TI 1315 accepts a maximum workpiece diameter of 13 ins. and threads up to 10 ins. diameter can be ground. The machine is fully automatic and the wheelhead is automatically retracted when a workpiece is finish ground to facilitate loading and unloading.

Two types of grinding wheel spindle are available, belt driven or high frequency. The former, driven by a 5 H.P. motor, has speeds of 15,000 and 18,000 r.p.m. and the latter has infinitely variable speeds from 12,500 to 40,000 r.p.m. The workhead is driven by a 1⅓ h.p. motor providing 7 spindle speeds, 6-105 and 12-210 r.p.m. The single ribbed grinding wheel, maximum diameter 3in., is automatically diamond dressed at preselected intervals. Single pass or multi-pass grinding can be carried out, the maximum number of passes being 24 and the total automatic wheel infeed ¼in. A swivelling movement is provided for the wheelhead unit to permit right and left hand threads with helix angles up to 15 degrees to be ground. Normal maximum thread length is 5in. **Rockwell Machine Tool Co. Ltd., Welsh Harp, Edgware Road, London, N.W.2.**

Reader service reference No. 187

Miniature broacher

A fully automatic model of the Lapointe SPD.7/16 range of pull-down broachers, the SPD.7/16A, will broach internal splines on component parts at a rate of 1,000 parts per hour, with a capacity of 7,000 lb. and a 16 inch stroke.

The machine can easily be loaded during the return stroke of the broach, thus reducing the loading time and this is achieved by means of a shuttle table suitably bored to take work holding fixtures for locating the components. A broach lifter is fitted which is adjusted to different lengths of stroke by moving it in accordance with a scale which indicates broach length. The addition of the shuttle table and broach lifter does not limit the variable speed and variable stroke features already existing on the basic SPD machine. For surface broaching of an external shape, the broach lifter and shuttle table can be removed from the machine.

Manual control of the hydraulic circuits is by a set of push buttons mounted on the hydraulic unit. The electric circuit is interlocked to ensure that the shuttle table cannot be moved except when the broach is at the end of either the cut or return stroke. **The Lapointe Machine Tool Co. Ltd., Otterspool, Watford By-Pass, Watford, Herts.**

Reader service reference No. 188

Conduit bender

Designed for bending conduit and similar material up to 1½in. O.D., the Staffa B3 utilises a single stage hydraulic pump/ram unit which develops a maximum thrust of 8 tons at 5,000 lb./sq. in.

The equipment consists of the pump-ram unit, screw-on forming head with end rollers, pins and cast centre formers for ¾, 1, 1¼, and 1½in. standard electrical conduits.

The machine is supplied in a wooden box which may be used as a convenient stand. Since the bending forces are triangulated, a conventional stand is unnecessary. **Chamberlain Industries Ltd., Staffa Works, Argall Avenue, Leyton, London, E.10.**

Reader service reference No. 189

Rotary oil burner

A continuously rated, variable speed, commutator motor type rotary oil burner, the Atlantic, is claimed to be exceptionally quiet in operation and to be capable of burning both light and heavy viscosity fuel oils. Fuel consumption can be controlled within the range from ½ to 5½ gallons per hour.

The De Luxe version contains a safety valve which stops the flow of oil on failure of electricity supplies or other cause and also contains a noise preventive mechanism, making the unit suitable for use in quiet areas.

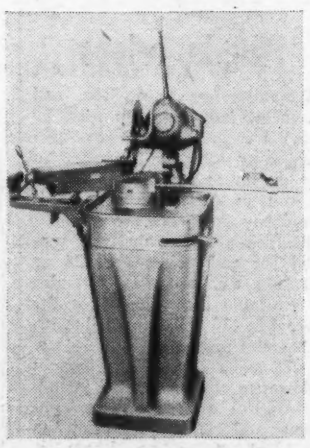
Measuring 18 by 9 by 14½in., this burner weighs 17.2 kg. Installation is a simple matter and there are many types of boilers, furnaces and ovens for which it is suitable. **Atlantic Distribution Industries (G. A. Walsh Group), 85 Carnwath Road, London, S.W.6.**

Reader service reference No. 190

Cutting-off machine

A hydraulic vice which closes automatically when the sawing head is lowered is incorporated on the Super Brown M1 sawing machine to speed up repetition work. The operator's left hand is thus free to feed the bar forward after each cut.

Maximum cutting capacity is 3in. and the machine can be used for cutting angle, channel, tube and bar. A two-speed motor is fitted and saws up to 9¾in. diameter can be accommodated.



CUTTING-OFF MACHINE
Hydraulic clamping

Mitre cuts up to 45 deg. right or left can be made by swinging the head round (the vice is fixed so that the work always projects in the same direction), and the head can also be swung through 180 deg. for longitudinal cuts. When in this position, the saw can be adjusted backwards or forwards to allow it to be centred on the work.

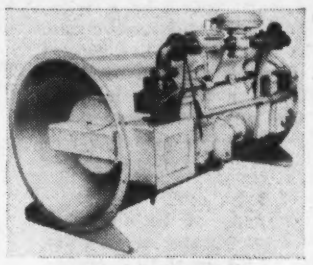
Coolant equipment is provided and the coolant is fed to both sides of the saw blade. The saw itself is driven through a friction clutch which allows it to slip if excess pressure is applied by the operator. This, in conjunction with the hydraulic vice which applies a clamping pressure of over 1,000 lb., is claimed to give a considerable reduction in saw breakages compared with other machines of this type. **The Addison Tool Co. Ltd., Marshalsea Road, London, S.E.1.**

Reader service reference No. 191

Gas air heater

Used in conjunction with a Woods Aerofoil fan, this heater is available in capacities from 163,000 to 1,000,000 B.Th.U/hr. and, depending on the volume of air being handled, its efficiency is such that between 75 and 80 per cent of the heat input is utilised.

Fully automatic push button starting and ignition is featured



GAS AIR HEATER
Push-button starting

together with automatic flame monitoring and cut-out switches to protect the equipment against failure.

Two versions are available: a straight through type affording high temperature rise in relation to air volume and a by-pass type providing large air movement with moderate temperature rise.

A number of air volume-pressure combinations can be achieved by selection of an appropriate duty fan. For summer use, the fan can be used alone. **Woods of Colchester Ltd., Braiswick Works, Colchester.**

Reader service reference No. 192

Thread restorer

All types of damaged and rusted threads can be reconditioned with the Buckingham thread restorer. There are ten models for threads from ¼in. to 12in. diameter, each model covering a range of right and left hand, metric, S.A.E., U.S.S. and Whitworth sizes. The tools can be used in confined spaces and, where the damaged thread is part of an assembly, the part does not usually need to be dismantled.

In use, the tool is applied to the bottom thread of the component, the blade jaws are closed until the die blades fit into the pitch of the thread, and the tool is then turned manually towards the operator until it disengages from the thread. No metal is removed, the blades having a rolling action.

Smallest model in the range, the 6803, is for 55-deg. threads from ¼in. to 1in. diameter. It weighs 1¼lb. and has a swing of only 3in. **G. E. Simm Engineering Ltd., 27 Broomfield Road, Sheffield, 10.**

Reader service reference No. 193

Sawing machine

Readily portable, the Ace-Zipp EW.20 has a capacity of 2¾in. straight cuts, mitre cuts up to 2in. diameter and solid steel up to 1¾in. Three types are available; type A is fitted with a fixed pipe vice, type B with a swivel pipe vice and type C with a swivel machine vice which also allows pipes and sections to be held. On models A and C the workpiece is supported on both sides of the saw.

The saw shaft is hardened and ground and fitted with roller bearings. The machine is powered by a ¾ h.p. motor and is suitable for cutting steel, non-ferrous metals, tubes and extrusions. **Urquhart Machine Tools Ltd., 60 Tabernacle St., London, E.C.2.**

Reader service reference No. 194

NEW Materials

High temperature silicone paints

A RANGE of silicone-aluminium paints which can stand up to working temperatures up to 550 deg. C. has been introduced. The paints are also resistant to most chemicals at moderate temperatures, although they are adversely affected by moist fumes containing large amounts of sulphur oxides. They can be applied by brush or spray.

Main applications of the coatings are for the maintenance of stacks, refinery installations and any metal surface exposed to corrosive conditions at high temperatures, also for the protection of industrial equipment such as ovens, furnaces and heating ducts. When used in conjunction with zinc-rich primers, they can withstand external exposure conditions at temperatures up to 400 deg. C. **Rayweir Products Ltd., Freshwater Road, Chadwell Heath, Essex.**

Reader service reference No. 195

Nylon belting

With a nylon core which is solid across the width of the belt, as opposed to the former strip construction, Nycor flat chrome leather faced belting is claimed to be far stronger and more pliable than other belts of this type. It can be used at speeds up to 10,000 ft./min. and with ratios of more than 40:1. The increased strength allows a narrower belt to be used for the transmission of a given power with a consequent saving in space.

The belts are normally supplied in endless form but bonded joints can be produced on site if required. **Graton & Knight Ltd., Warwick Road, Borehamwood, Herts.**

Reader service reference No. 196

Solvent cleaner

A chlorinated solvent, to be sold under the trade name Genklene, is non-inflammable, of medium volatility and low toxicity, and therefore specially suitable for cold cleaning. It is recommended for cleaning machinery in situ without dismantling and for other routine production and maintenance jobs, and can be applied by wiping, dipping or spraying. Contaminated solvent can be purified for re-use if required. **Imperial Chemical Industries Ltd., Millbank, London, S.W.1.**

Reader service reference No. 197

P.T.F.E. tape

Chemically inert to many acids, gases and solvents, Hilflon thermoplastic tape possesses a coefficient of friction of 0.04 nominal and an exceptional thermal stability. Available in ½ inch wide by approximately 40ft. long and 0.003 in nominal thickness rolls packed in metal containers this tape makes a neat, clean joint on pipes and other threaded components made of most materials. Due to its low coefficient of friction, the tape has an anti-seizing property and allows connections to be drawn up very tightly.

Special grades of this tape are available for insulating purposes in the electrical field. **William Rose Ltd., Hilyn Works, Lockfield Ave., Brimsdown, Enfield, Middlesex.**

Reader service reference No. 198

Chromating process

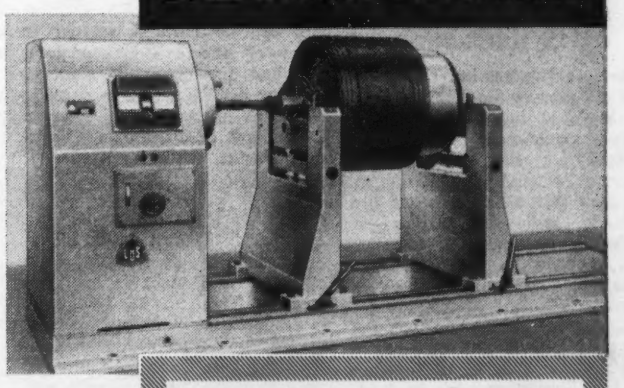
Designed to operate at room temperature and to produce chromate coatings on hot dipped galvanised steel, electro - zinc plated steel or zinc-based alloys, the Bonderite 250 series give considerable corrosion protection and form an excellent surface for subsequent painting. There are three processes; Bonderite 250 produces a colourless coating with reasonable corrosion resistance, Bonderite 251 also produces a colourless coating but with increased corrosion resistance, Bonderite 255 produces a yellow coloured film which has a high corrosion resistance.

Major advantages claimed for the Bonderite 250 range are ease of chemical control and low costs. **The Pyrene Company Limited, Metal Finishing Division, Great West Road, Brentford, Middlesex.**

Reader service reference No. 199

LOS

LOSENHAUSENWERK
BALANCING MACHINES



- Balancing with **rigid** supports to simulate operating conditions
- Only with 'LOS' built in piezo elements
- Which incorporate more than 30 years experience
- Without trial or calibration runs
- Measures directly the effective centrifugal forces of unbalance in weight units (grams or ounces)
- Can be operated by unskilled labour
- Only with the 'LOS' Balancing Machine can you have all these advantages

Write now for full details and illustrated literature to :-

FENTER
MACHINE TOOLS LTD

Telephone: ASTon Cross 1551 (3 lines)

184 ASTON ROAD - BIRMINGHAM 6

NEW Components

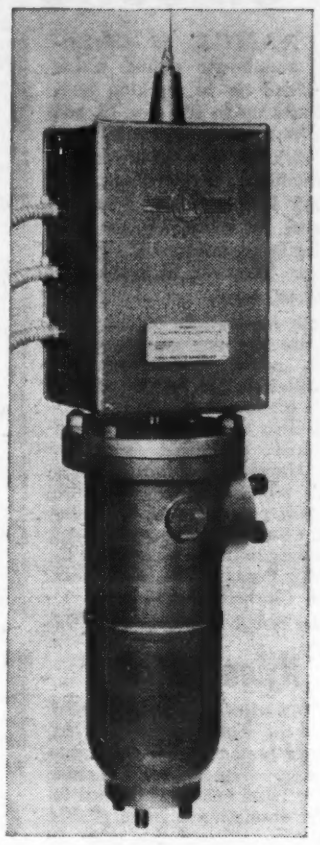
Modulating boiler level controller

MODULATION of feed water supply to shell type and water tube boilers is provided by the Mobrey modulating level controller, a simple, single element device.

Standard models are available for working pressures up to 250 lb./sq. in. and controllers for higher pressures can be supplied to customers' specifications. Three sizes of modulating feed valve body are available: 1in., 1¼in., and 2in. Also incorporated in the controller are a low water cut-out and an alarm switch and therefore only one additional control is required to comply with the insurance requirements for unattended fully automatic boilers.

Large boilers, those over about 8,000 lb./hr. evaporation, give rise to one or two problems concerning the on-off control of electric pumps. With a close differential, the standard starter fitted to the pump is liable to give trouble due to too frequent operation and consequent overheating. Increasing the differential often causes the steam flow to fall considerably. Where process temperatures have to be maintained by the steam, this could seriously affect the end product. **Ronald Trist & Co. Ltd., Bath Road, Slough, Bucks.**

Reader service reference No. 200



LEVEL CONTROLLER
Avoids starter troubles

Push button switch

Having a contact rating of 150 mA at 250 volts r.m.s. on a non-reactive load and a continuous rating of 5A r.m.s., the Plessey miniature push button switch is available with one to twelve buttons. Of compact design, it is suitable for inclusion in domestic radio receivers and similar equipment where space is restricted. Each button can provide up to 6 pole changeover switching per side, giving a possible 12 poles per button. Press-to-set and press-to-release operation is available on any combination of buttons.

The switch is available for standard chassis mounting or printed circuit applications. In the printed circuit version, the contacts are arranged so that they plug in to their respective circuit points when the switch is mounted horizontally in relation to the printed circuit panel. **The Plessey Co. Ltd., Ilford, Essex.**

Reader service reference No. 201

Strip panelling

Rectangular section tube is used to convey the heating fluid in the latest form of Brightside strip panelling. Advantages claimed for this method are: improved thermal contact between the tube and plate; more of the primary radiating surface is horizontal, thus more of the total heat emission is converted into radiation; convection loss is limited by the use of longitudinal shields; the rectangular sections are more pleasing in appearance. **Brightside Heating & Engineering Co. Ltd., Ecclesfield, near Sheffield.**

Reader servic reference No. 202

Packaged generators

A range of packaged, brushless, synchronous generators recently introduced cover outputs of up to 350 kW, rotational speeds being either 1,200 or 1,800 r.p.m. Each unit is supplied ready for immediate connection to the power source and includes brushless exciter, static voltage regulator, ammeter and voltmeter. Maintenance requirements should be lower than for a conventional generator as there are no collector rings, brushes or commutators.

Selector switches are fitted to give current and voltage indication on all three phases and cross-current compensation where there are multiple units in parallel. There is also provision for separately mounted meters and voltage regulators.

Hermetically sealed silicon diode rectifiers for the field excitation current are mounted on the generator shaft, and rotate with the exciter armature and the main generator rotor. **The International General Electric Co. of New York Ltd., 296 High Holborn, London, W.C.1.**

Reader service reference No. 203

Double eyepiece

A double eyepiece which permits simultaneous viewing of a microscope specimen by two people, is manufactured by Carl Zeiss of Western Germany. It requires no special illumination and can be quickly inserted in place of the existing eyepiece. Supplied for either 25 mm or 30 mm dia. tubes, it is suitable for most makes of microscope. **Degenhardt & Co. Ltd., 6 Cavendish Square, London, W.1.**

Reader service reference No. 204

Stop valves

A recently developed motor operated stop valve is available in sizes from 3in. to 10in., and is designed for working pressures up to 550 lb./sq. in. Actuation of the valve is by means of a screwed spindle mating with a split nut. The spindle is driven by a reversing motor at a speed of 25 r.p.m. and moves up and down to operate the valve.

As the spindle lowers it compresses a spring. In the event of an electrical failure the split nut is disengaged automatically from the spindle and the valve is returned to either the open or closed position under spring pressure, depending on the type of valve seat fitted. On renewal of the electrical supply, the actuator will take control again without the necessity for adjustment. The valve can also be manually operated by an override mechanism. **I.V. Pressure Controllers Ltd., 683 London Road, Isleworth, Middx.**

Reader service reference No. 205

Transistor timers

Two transistorised timing devices recently introduced for the control of portable spot welding guns can also be used with other types of equipment where accurate electronic control is required.

The Mark II unit, with a 210-250 volt input, is designed to switch a line current of up to 30 amps. It has a timing accuracy of ± 1 cycle with a mains voltage fluctuation of up to 10 per cent. Initiation of this timing cycle is controlled by a micro switch in a low voltage circuit.

The Mark IV, with a 240-415 volt input, is designed to switch a 100-amp. line current. Initiation is again by low voltage micro switch and accuracy of timing is ± 1 cycle or 1 per cent, whichever is less, with a mains fluctuation of 6 per cent.

Time cycle of both units is from 2 to 50 cycles and is determined by the discharge of current from a storage capacitor to a switching transistor. Duration of the current discharge is controlled by a variable resistor. **Portable Welders Ltd., Castle Mills, Buckingham, Bucks.**

Reader service reference No. 206

Cable glands

A range of adjustable cable glands have been developed for use with p.v.c. insulated cables and with all S.W.A. cables. The fact that the glands are adjustable means that variations in cable dimensions and inaccuracies in preparation of the cable ends can easily be accommodated. There is full thread engagement between the gland components at all times, irrespective of the diameter of the armouring wire.

Each size of gland will centre in two sizes of knock-out hole, and seven sizes cover cable sizes from 3 x 029 up to 61 x 103, in a range of voltages from 250 to 3,300.

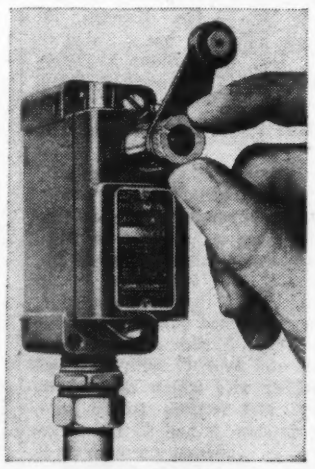
A 30-40 ton manganese-bronze is employed for the gland components, and they are finished in tin-nickel plate. **Cable Covers Ltd., St. Stephen's House, Westminster, S.W.1.**

Reader service reference No. 207

Limit switches

Two new types of adjustable operating arm have been introduced for the Square D class 9007 limit switch range.

The first is a roller arm adjustable through 360 deg. It can be set to any angular position by turning a knurled micrometer dial on the spindle. There is a graduated scale on the spindle marked in 20-deg. divisions and each complete turn of the micrometer dial moves the arm from one graduation mark to the next. Accurate presetting to any angular position is possible. Rollers of ⅛in. diameter and ¼in. wide are fitted and the arms are available in various lengths from ¼in. to 3in.



LIMIT SWITCH
Radial adjustment

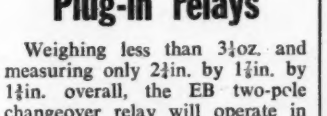
The other addition to the range is a slotted roller arm whose length can be adjusted between 1in. and 4in., the object being to cut out setting up modifications. **Square D Ltd., Cheney Manor, Swindon, Wilts.**

Reader service reference No. 208

Impulse cylinder

To meet the growing demand for pneumatic control equipment in the high temperature field, Consultair have introduced a 1in. bore impulse cylinder designed for working temperatures of 400-500 deg.F. No conventional seals are employed and leakage is prevented solely by the mating of accurately machined surfaces of high surface finish.

There are only four component parts and mounting holes are provided in the cylinder body. Standard stroke is 2in., although



IMPULSE CYLINDER
No seals

this can be varied within limits to customers' requirements. Overall length of the unit, retracted, is 6 3/16in., the height is 1 9/16in. and the width 2¾in.

A port is provided in the body for pressurised lubrication and the cylinder can also be supplied with a dry lubricant such as molybdenum disulphide bonded to the mating surfaces. **Consultair Ltd., 222 Soho Hill, Handsworth, Birmingham, 19.**

Reader service reference No. 209

Miniature amplifier

Weighing only about ⅔ ounce, a miniature encapsulated three transistor amplifier with full Ministry of Aviation type approval, has a voltage gain of 50 dB and contains a surge limiting diode and an output control.

Designed for the replacement of carbon microphones by high speech quality magnetic and noise-cancelling units, it is intended for mounting in hand microphones, in the handles of telephone handsets, and in aircraft radio transmitters, particularly those of American manufacture. Component density in this device is over 300 per cubic inch. **Amplivox Ltd., Beresford Avenue, Wembley, Middx.**

Reader service reference No. 210

Plug-in relays

Weighing less than 3½oz. and measuring only 2¼in. by 1⅞in. by 1¾in. overall, the EB two-pole changeover relay will operate in any mounting position. It is encased in clear plastic and is completely dustproof.

The relays will normally be supplied for coil voltages of 24 or 220 volts a.c., but they will also be available for voltages in the range 4 to 110 volts a.c. or d.c., or, with series resistors, 400 volts a.c. or 220 volts d.c. They have a wide range of applications including control systems where continuous and frequent operation (up to 3,600 cycles an hour) is required.

Solid silver contacts which need no maintenance are employed and they have a life of over 10 million operations, with a normal switching current capacity of 6 amps at 250 volts a.c. or 2 amps at 400 volts a.c.

Base fittings are international octal type and a plug-in baseplate is available for solderless wiring.

For a.c. applications the operating time is approximately 10 milliseconds and the release time 8 milliseconds, while for d.c. use both operating and release times are approximately 8 milliseconds. **Dewhurst & Partner Ltd., Inverness Works, Hounslow, Middlesex.**

Reader service reference No. 211

NEW Publications

Four illustrated booklets by B.I.P. Chemicals Ltd., deal with four of a range of synthetic resins. No. 1—**Polyester Resins,** describes qualities and applications of these resins, gives practical information on moulding and details of chemical resistance and technical information. No. 2—**Textile Resins.** These produce such qualities as stain resistance, crease resistance, and shrink resistance. Also used for glazing, embossing, stiffening, pleating, and non-ironing processes. The booklet traces the development of these resins and gives full technical data on them. No. 3—**Melamine Laminating Resins,** gives a full description of physical and laminating properties of each resin and their suitability for various purposes. No. 4—**Paper Resins.** Printed on wet strength paper, gives an introduction on wet strengthening resins and two leaflets on application of Beetle resins in coating slips and surface treatment of paper.

Reader service reference No. 212

Produced by the Department of Scientific and Industrial research, a booklet, **Silicones at Work,** reviews the many industrial applications of these versatile compounds. The development, composition, manufacture and uses in engineering, electrical, plastics and other industries are covered together with the various properties applicable to these uses.

Reader service reference No. 213

An illustrated booklet from Audco Ltd., deals with their lubricated taper plug valve, available up to 24ins. bore and 5,000 p.s.i., used in gas distribution. This valve was designed to operate under widely diverse conditions of service and this is achieved by a lubricant film between the plug and body which, besides ensuring easy rotation of the plug, also provides a perfect seal. The booklet explains these features and gives a guide to selection of valves for various conditions. Operating equipment, power operation, remote control, and lubrication are also dealt with.

Reader service reference No. 214

Solid carbon dioxide, sold under the trade name Drikold, is the subject of an illustrated booklet by I.C.I. entitled **Drikold and the repair of oil pipes.** This substance has a temperature of minus 110°F and by isolating the faulty section of pipe as described with plugs of frozen oil, repairs can be carried out with the minimum of inconvenience. Freezing times for various oils in different sizes of pipes are given and dimensions of suitable freezing troughs to hold the mixture of Drikold and alcohol are detailed.

Reader service reference No. 215

The rebuilding of the coastal town of Agadir after it was devastated by earthquake in 1960 is the subject of an illustrated booklet issued by Dexion Ltd. Describing the complete operation from supply to completion, this booklet shows how Dexion slotted angle can be used in cases of emergency construction.

Reader service reference No. 216

Issued by Bouchayer & Viallet, a profusely illustrated booklet on the planning, manufacture and erection of penstocks or pipelines for hydro-electric schemes gives many examples and details of these projects which are scattered all over the world. Entitled **A Century of Penstocks,** it outlines development of technique, technical advances made and the methods used in the production and putting into service of penstocks.

Reader service reference No. 217

Illustrating their range of Duraglas glass-fibre insulation tapes, Turner Brothers Asbestos Co. Ltd. have issued a compact sample card. These tapes are supplied to the electrical industry in various widths and thicknesses and their properties include heat resistance, electrical strength and good space factor. All tapes are fully described in a booklet issued with the sample card.

Reader service reference No. 218

Finned tubing produced in various metals is the subject of an illustrated booklet issued by I.C.I., **Integron High-fin and Low-fin Tubing.** Method of manufacture, properties and applications are described together with details of special finishes and materials. Also included is a comprehensive set of tables giving dimensions, tolerances and other technical data.

Reader service reference No. 219

A Manual of Marine Paints issued by John S. Craig & Co. Ltd., has two sections. Section A, painting systems for ships, covers everything from the preparation of steel for painting to protection of aluminium, galvanised iron, and wood, both exterior and interior. Section B, reference data pages, supplies all necessary information on the use and qualities of many types of primers and paints together with the particular places where they are recommended for use.

Reader service reference No. 220

READER ENQUIRY SERVICE

November 9, 1961

Please circle the reference number on the item on which you would like further details. Post to Reader Service Department, Engineering News, Heywood & Co. Ltd., Drury House, Russell Street, Drury Lane, London, W.C.2.

184	185	186	187	188
189	190	191	192	193
194	195	196	197	198
199	200	201	202	203
204	205	206	207	208
209	210	211	212	213
214	215	216	217	218
219	220			

220

BLOCK LETTERS THROUGHOUT

Your name .....

Position .....

Department .....

Company's name .....

Address .....

.....

Nature of business .....

ENGINEERING CONTRACTS

£800,000 order for Sheffield firm

AN £800,000 contract has been placed with Brightside Foundry and Engineering, of Sheffield, for a 32in. blooming mill for Brown Bayley Steels, and reconstruction of Brown Bayley's present 28in. mill at their Attercliffe works.

Associated Electrical Industries-BIRLEC Ltd. are to supply two furnaces worth £153,000 to Poland.

Each of these continuous twin-track, gas-fired gas carburising furnaces has an output of 300 kg/hour.

The contract, placed by Centrozap, also covers washing machines, tempering furnaces, conveyor track and other items. The furnaces will be used mainly for heat treating gears and other tractor components.

* * *

Eimco loading and haulage equipment is to be used by Edmund Nuttall, Sons and Co. (London) who recently were awarded the contract for the construction of the Cruachan underground pumped-storage power station.

The 400 MW pumped-storage scheme is part of the Loch Awe scheme of the North of Scotland Hydro-Electric Board in which there will be conventional hydro-electric stations at Nant and Inverawe.

Pumps for India

Boiler feed pumps for the Cossepore power station, in India, are to be manufactured by Mather and Platt, the Manchester engineers.

* * *

An order for 120 electric motors from ¼ hp to 4,000 hp for Foster Wheeler and Co., for installation at a new butyl rubber plant to be built at the Esso Refinery, Fawley, Hampshire, is part of new contracts worth £170,000 placed with the Motor and Control Gear division of Associated Electrical Industries.

* * *

Motors, generators and control equipment for a nine section machine producing vinyl asbestos floor tiles have been ordered by David Bridge and Company.

Constructors John Brown require 82 motors as part of the work in doubling the capacity of Imperial Chemical Industries' polypropylene plant at Wilton. The original 150 motors for this installation were supplied by the division last year.

Fifth repeat

A 1,450 s.h.p. twin screw, diesel-electric propulsion installation for a new district tender vessel for Trinity House is to be built by English Electric.

The contract is worth £120,000 and this is the fifth set of diesel-electric machinery ordered from English Electric by the owners.

Building the tender are J. Samuel White and Co. The four main engines will be made at the Vulcan Foundry, Newton-le-Willows, the main propulsion and auxiliary generators at Bradford and the propulsion motors and control gear at Stafford.

The installation is to be engineered by the company's marine department at Rugby, who are responsible for the contract.

* * *

Millspaugh Wimpey Ltd. have placed an order with GEC (Engineering) Ltd. for a 7MW double-passout condensing turbo-generating set for installation in a pulp and paper mill at Plaski, Yugoslavia.

FINANCE AND COMMERCE

ISB ANNOUNCE NEW STEEL PRICES

U.S. ferro-molybdenum pushes up costs

INCREASES in the maximum prices of some iron and steel products, and some decreases, have been announced by the Iron and Steel Board following an increase in the price of ferro-molybdenum. Revision of the price structure for hot rolled carbon steel strips has resulted, in general, in higher prices for the thicker material in all widths and lower prices for thinner material in widths of two to six inches.

Some increases have been authorised in the prices of the thicker groups of cold rolled strips.

Ferro-molybdenum is imported chiefly from the U.S. and is used in certain steels as an alloying agent. After two and a half years of stability the price rose last August from £1,437 to £1,577 a ton.

The price per ton of alloy steel black bars, specification EN 16 (molybdenum .20/.35 per cent) has risen from £71 19s. to £72 11s. In the specification EN 27 (molybdenum .20/.65 per cent) the price has moved to £114 13s. from £113 11s.

A new schedule has been prepared for tinplate and blackplate consolidating the one per cent increase authorised in June and the increase of October 1, following the operation of the automatic tin price formula.

Reissue of the schedule does not constitute a change in the existing price level.

Product	OLD PRICE per ton £. s. d.	NEW PRICE per ton £. s. d.
Hot Rolled Carbon Steel Strip		
18" x 3/16"	41. 2. 2.	41.19. 0.
12" x 3/16"	38.16. 8.	41.14. 0.
6" x 3/16"	41. 7. 0.	43.14. 0.
18" x 10G	42. 2. 4.	41.19. 0.
12" x 10G	41.14. 9.	41.14. 0.
12" x 14G	42.15. 0.	42.14. 0.
6" x 14G	42.15. 0.	42.14. 0.
4" x 14G	42.15. 0.	42. 9. 0.
12" x 17G	44. 5. 3.	44. 9. 0.
8" x 17G	44. 2. 9.	45.14. 0.
6" x 17G	44. 5. 3.	43.19. 0.
4" x 17G	44. 5. 3.	42.19. 0.
3" x 17G	45. 5. 6.	44. 9. 0.
Cold Rolled Steel Strip		
2" x 10G	62. 2. 4.	63.10. 0.
6" x 10G	59. 6. 9.	62. 0. 0.
12" x 10G	56.16. 3.	58. 0. 0.
18" x 10G	56.11. 3.	57.15. 0.

BETTER SALES ABROAD

BETTER sales in France and West Germany gave September's export sales of office machinery a strong increase over the same month in 1960.

The £2,972,776 worth of office machinery exported in September brought the total up to October this year to £28.7 million compared with £27.0 million in the equivalent months of last year.

The best customers in the first nine months of the year were reported by the Business Equipment Trades Association to be Australia £2.6 million (£2.9 million); the United States £2.1 million (£1.6 million); South Africa £1.7 million (£2.3 million).

TRADE AGREEMENTS

EE–ASEA SIGN PATENTS PACT

PATENTS and patent rights in high voltage DC transmission equipment are covered by an exchange agreement concluded between the Swedish ASEA company **(Allmanna Svenska Elektriska Aktiebolaget)** and **English Electric.**

John Brown and Co. have bought the share capital of **Talbot-Ponsonby,** designers and makers of precision dies and moulds.

This company is complementary to another John Brown subsidiary, **Cravens (Machines) Ltd.,** of Sheffield, and three of Cravens' directors have joined the Talbot-Ponsonby board.

New agents in India and Yugoslavia have been appointed by the **Tempered Spring Co.,** a member of the Tempered Group, of Sheffield.

The Sheffield firm's sales to the agricultural industry in India (tines, hot and cold presswork and springs) will be represented exclusively by the **New India Equipment Co.,** of New Delhi. The new agents in Yugoslavia are **"Intercommerce" General Trade Agency,** Belgrade.

Wickman, the Coventry machine tool manufacturers, have announced an agreement which gives them the exclusive marketing rights in Britain and Northern Ireland of all "Red Ring" products, among them—gear shaving, gear honing, gear checking machines and equipment, gear shaving cutters and gear honing tools.

Wickman also become the sole concessionaires for all **"Red Ring"** American machines and equipment built by **National Broach and Machine,** of Detroit, Michigan, USA, the parent company.

The agreement additionally covers British built Lees Bradner Hobbing Machines made by **Precision Gear Machines and Tools Ltd.,** of Coventry.

Czech agency

Agents for all Czechoslovakian measuring equipment sold in the UK are now **George Cohen Sons and Co.** The range includes Suprahon Surface Roughness specimens in two types and hardness testers of portable and bench types covering Brinell, Rockwell, and Vickers readings.

Other instruments with the "Somet" and "Meopta" marks include an optical dividing head, profile projector, universal bevel and Comparex microscope for optical inspection and comparison of surface finishes.

This equipment is being handled by George Cohen's Engineers' Precision Tools Department, which is shortly moving to Sunbeam Road, London, NW10.

Lucas in India

A new company for the production of vehicle electrical equipment for the expanding Indian motor industry has been jointly formed by **Joseph Lucas Ltd.** and **T. V. Sundaram Iyengar and Sons** (TVS) of South India.

Some components will be imported at first to give an early start to production but the degree of local production at the new company, **Lucas-TVS,** will increase according to programme. More than £1 million worth of new machinery is to be provided by Lucas.

Turner and Newall Ltd. have formed, with **Cement Ltd.,** of Dublin, a company to be named **Asbestos Cement Pipes Ltd.** The Irish company will hold at least two-thirds of the £550,000 capital, the rest being subscribed by Turner and Newall.

LOADERS FOR ARGENTINA

These Chaseside Loadmaster 1,000 four-wheel drive loading shovels were recently ordered for the Santiago del Estero province of Argentina. They are part of a £1,500,000 contract, obtained by Knowles and Foster of London and Mercator SA of Buenos Aires, for British construction equipment.

T. W. WARD TURNOVER TOPS £52 MILLION

THE long line of engineering company chairmen calling for relief from the burdens of high interest rates and high taxation in order to earn more in the export markets, and calling also for better credit facilities, is joined by Mr. H. W. Secker, chairman of Thomas W. Ward, heavy engineers and machine tool makers.

The Thomas Ward chairman declares that at the moment he can see no sign of improvement in the outlook for the steel industry and it is the level of steel production which will in the next few months have the greatest effect on the company's results.

Satisfactory profits are expected to be kept up in those parts of the group supplying engineering products over the next 12 months.

While declining steel production has resulted in reduced scrap demand from the company's yards, it has been found in the past that when demand slackens competition is not so severe and profit margins improve.

Foreign competition

Intense foreign competition is being met with quotations that are as keen as possible.

Group turnover and profits both rose to new records. Turnover appreciated by £2.5 million to £52 million. Group net profits improved from £1,468,249 to £1,592,601.

Dividend is being held at 13¼ per cent.

T.I. group profit up

THE widely spread Tube Investments group shows its strength in a time of generally clipped profit margins by returning a group trading profit for the year 1960-61 of £27,161,023, against £24,112,288.

After heavily increased depreciation and income tax the net profit is £10,364,746, compared with £9,923,838.

The group includes the British Aluminium Co. whose profits for the year declined by £1.5 million, and the Raleigh cycle interests, whose profits fell from almost £2m. to just above £1m.

The total group results yield 14 per cent dividend three times covered. The tube division appears to have done well in spite of a slight fall in the total U.K. output.

Tube Investment's iron and steel division has also played a substantial part in the final returns.

Export opportunities

GREECE (local representation essential) Nato infrastructure contract. Telephone installations at airfields (approx. value £151,250). The supply and installation of telephone installations at two airfields. Firms wishing to tender should apply by November 20, 1961, to the Directorate of Public Works, GAS, 9, Lycurgus St., Athens. Copies of letters to the UK Embassy, Athens, and to the Board of Trade, General Division, Room 5375, Horse Guards Avenue, London, SW1. Ref. GD 145/60 (31).

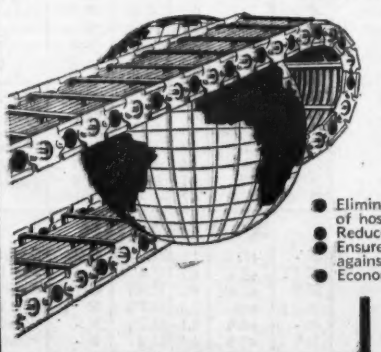
INDIA: Reduction gear boxes—466 worm reduction gear boxes hand operation, for the opening and closing of chutes (3ft. 6in. by 4ft.) of coal bunkers. Bids should be sent (quoting Enquiry 452/61) to the Singareni Collieries Co., Kothagudium Collieries PO, Bhadrachellam Road Station, Central Railway, Deccan. The company favour U.K. firms who are represented in India, to handle after-sales service. Closing date December 13, 1961. ESB 33481/61.

Belt Conveyor Drive Units—23 single-drum drive head units, with tail heads for 48in. belt conveyors, comprising 24in. drive drum, snub pulley, 8in. diameter, worm reduction gear, high torque motor (12.5 hp, 1,000 rpm) supporting structure and tail-end.

Bids to the Singareni Collieries as above, quoting Enquiry No. 447/61. Closing date December 7, 1961. ESB 33476/61.

Inquiries should go to the Export Services Branch, Board Trade, Lacon House, Theobalds Road. W.C.1, before dates given. References (ESB) should be quoted.

THE MODERN WAY TO CARRY CABLES AND HOSES



KABELSCHLEPP CABLE DRAG CHAINS

The most efficient support for carrying cables, hoses, etc., on machine tools, cranes, stackers, mining and shipbuilding equipment, or any movable machinery.

- Eliminates excessive bending or crushing of hoses and cables
- Reduces friction to a minimum
- Ensures maximum reliability and safety against accidental contacts.
- Economical in space, simple to assemble

Write for catalogues and further details and suggested applications.

KABELSCHLEPP GMBH
SIEGEN/WESTFALEN, GERMANY
Hagener Strasse 61 · Postfach 384
Ruf 222 48/49

Sole Agents for British Isles
E. M. SENIOR
BOURTON, Nr. RUGBY
Telephone: MARTON 276

FINANCE AND COMMERCE

BAC PROFITS DROP BY £1½ m.

Economies are being enforced at all company plants

MAJOR cost reduction and rationalisation programmes are being carried through in all the plants of the British Aluminium Co. Large scale expansion of the BAC rolling mill at Falkirk is planned although the timing of this move is to be reviewed in the light of economic developments.

Trading profits for the past year of British Aluminium, a Tube Investments subsidiary group, were £3,250,656, after depreciation, a fall of more than £1.5 million from 1960. No great improvement in the position is predicted this year by the chairman, Lord Plowden, except in the primary product operations.

Falling profits were caused by a reduction in the demand for semi-fabricated aluminium products in Britain and to a markedly adverse movement in prices in some export markets.

Poor water conditions in the Scottish Highlands limited the power available to the Highland Reduction Works and Lord Plowden reports in his annual statement that this led to material loss of profit.

'No chance of improvement this year'

Development work includes growing research expenditure, and the launching of the British Aluminium Building Service to assist builders and architects. Aluminium is now used in the trimming of 20 main models from the U.K. car makers.

Aluminium ingots being imported into the Common Market are subjected to a tariff. Those coming into the U.K. are not.

For the protection of the company's position as an integrated producer and of its substantial investment in the Canadian Aluminium Investment Co. the BAC board believe it to be in their interests that imports into the U.K. should continue to be duty-free.

Entry of Britain to the European Economic Community would mean the progressive removal of the present tariff on imports of aluminium semi-manufactures from the EEC.

ADVICE BUREAU ON EEC

INFORMATION on establishing factories in Western Europe and on marketing and distribution, is to be provided by a new European service of Personal Administration management consultants.

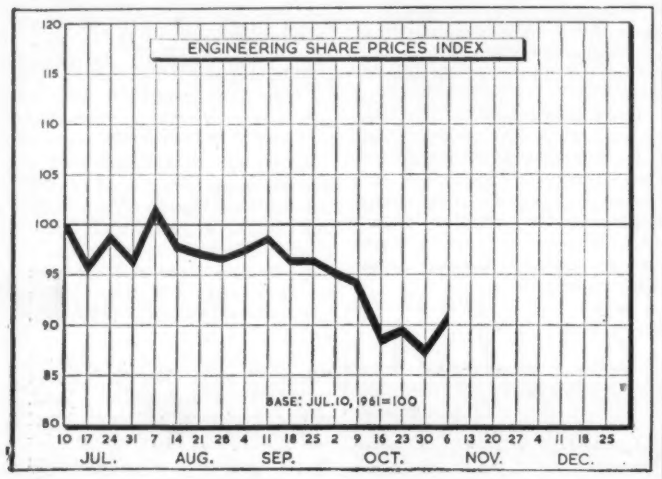
Centres will be set up in France, Germany, Italy, Switzerland and Scandinavia. An important part of the assistance available will be advice on the possibilities for liaison or merger arrangements with businesses on the Continent.

The new service will cover appropriate sites for factories, labour availability, and other local information.

ANOTHER WANKEL AGREEMENT

ANOTHER agreement has been signed for developing Wankel rotary engines in West Germany. It is a licensing agreement of the heavy vehicle group Kloeckner - Huboldt - Deutz AG with the NSU and the Wankel companies.

KHD are to develop the Wankel engine as a diesel.



Valves output rises but profits fall

OUTPUT from the British valve manufacturers in 1961 is likely to be a record for the industry. 1960's production reached £38.2 million, which was also a record. In the first half of this year output was worth more than 10 per cent more than in the same period of 1960 and valve exports have also been running at a higher rate.

Inquiry among members of the British Valve Manufacturers' Association show that last month the rate of new orders was in general higher than six months earlier. Half the replies show an increase, only one tenth a decline.

The general level of output has risen, limited in a number of works by shortage of skilled labour. Shortage of stainless steel components, such as castings, and bar material have affected output in some cases.

Mr. F. Burgess, chairman of the BVMA, and managing director of Whites-Nunan, who was speaking at the annual meeting of the association, assessed the position of the industry as "not unsatisfactory" although profit margins had fallen.

1962 Victor goes to U.S.

SHIPMENT to the United States of Vauxhall Motors 1962 Victor models is to begin next month, followed, it is expected, by the start of double shift working at the Luton, Bedfordshire, factory on January 1.

Reports on the reception of the new range in each country in which it has been introduced indicate that production at Luton will have to be lifted to a higher level than for more than a year past.

In addition to the preliminary shipments of December, production of the new VX 4/90 model is to begin in January.

Mr. William Swallow, chairman and managing director of Vauxhall, maintains his forecast that the fast-rising European sales of the new Victor will reach sales figures three or four times those of previous models.

ENGINEERING NEWS SHARE PRICES TABLE

1961 High	1961 Low	Stock	Nov. 6	Ch'ge	Y'ld p.c.	1961 High	1961 Low	Stock	Nov. 6	Ch'ge	Y'ld p.c.
47/9	30/9	Allen, Edgar (£1)	31/9	+1/-	8.3	57/-	44/9	Lister, R.A.(£1)	52/3	+1/-	5.2
43/-	25/-	Allen, W. H. (£1)	25/-	–1/6	7.7	51/9	36/-	Mather & Platt (£1)	37/-	+1/-	5.9
77/-	58/6	Angus, George (£1)	67/6	...	5.9	67/-	46/-	Metal Industries (£1)	48/9	+2/9	6.1
31/10½	19/-	A.P.V. (10/)	30/3	+1/3	3.7	71/3	53/4½	Morgan Crucible (£1)	58/9	+6d.	4.7
14/1½	8/10½	Asquith Machine Tool (5/)	10/-	+3d.	2.4	31/-	18/3	Morris, Herbert (10/)	18/3	–1/3	7.6
48/6	29/-	Assoc. Electrical Ind. (£1)	31/3	+1/6	9.5	52/-	37/3	Murex (£1)	39/-	+1/3	6.6
16/5	11/8	Assoc. Engineering (5/)	13/3	+10½d.	5.0	49/6	40/6	Needsend Steel (5/)	43/6	+6d.	5.8
110/-	83/-	Averys (£1)	85/-	...	3.5	31/6	20/6	Newton Chambers (5/)	20/6	–6d.	4.7
36/9	20/-	Babcock & Wilcox (£1)	21/9	...	...	41/3	21/3	Parkinson Cowan (£1)	21/4½	+1½d.	8.2
59/6	40/6	Baker Perkins (£1)	44/6	+9d.	5.0	72/9	47/-	Parsons, C. A. (£1)	49/-	+6d.	5.0
9.7½	5/10½d.	Beyer Peacock (5/)	6/3	+1½d.	9.2	40/3	38/-	Plessey (10/)	41/3	+3/-	3.6
77/-	45/-	Birfield (£1)	62/-	+6d.	3.2	33/-	16/-	Pressed Steel (5/)	17/4½	–4½d.	8.5
102/10½	68/3	Birmid Industries (£1)	69/-	+6d.	6.1	25/3	19/9	Qualcast (5/)	21/1½	+1/4½	4.2
36/10½	19/6	Birmingham Small Arms (10/)	21/7½	+2/1½	5.3	38/1½	22/3	Radiation (£1)	22/6	+3d.	8.8
45/6	33/6	Brockhouse, James (£1)	34/6	+6d.	7.1	22/6	14/-	Ransome & Marles (5/)	14/9	...	4.6
28/9	22/2	Broom & Wade (5/)	25/6	+1/3	4.3	28/6	22/6	Ransomes, Sims & Jeffs (£1)	23/-	...	6.5
42/6	29/9	Brotherhood, Peter (10/)	30/3	+6d.	8.0	50/6	34/6	Renold Chains (£1)	39/3	+6d.	5.0
48/9	30/4½	Brown, John (£1)	32/7½	+2/3	6.6	52/3	38/-	Reyrolle, A. (£1)	39/-	+9d.	4.9
8/6	4/6	Cammell Laird (5/)	4/6	...	...	9/1½	3/10½	Richardsons Westgarth (10/)	3/10½	–1½d.	...
39/6	29/3	Carrier Engineering (5/)	31/3	...	3.9	9/3	4/9	Roberts, Charles (5/)	5/1½	+4½d.	...
54/3	36/6	Clarke Chapman (£1)	40/-	...	6.7	48/6	39/6	Rolls-Royce (£1)	39/6	–3d.	5.5
14/9	9/6	Cohen, George (5/)	10/-	+6d.	6.2	32/6	20/-	Ruston & Hornsby (£1)	20/-	...	8.7
33/10½	21/8	Coventry Gauge & Tool (10/)	29/3	+9d.	4.1	19/3	14/-	Serck (5/)	13/3	+1½d.	4.6
12/3	7/3	Craven Brothers (5/)	8/6	+6d.	4.9	23/9	12/7½	Shaw, Francis (4/)	13/6	+4½d.	5.8
24/-	17/6	Crofts Engineers (5/)	19/3	+3d.	4.3	12/-	8/6	Sheepbridge Engrg. (5/)	8/7½	+1½d.	8.2
39/7½	32/-	Davy-Ashmore (5/)	30/3	+6d.	4.4	32/4½	19/1½	Simms Motor (5/)	23/6	+2/3	3.7
70/-	44/3	De La Rue (10/)	46/6	+2/3	4.7	44/1½	29/7½	Simon Engineering (5/)	33/4½	+10½d.	4.1
27/7½	19/9	Delta Metal (5/)	20/9	+9d.	4.7	23/9	13/9	Smith, S. & Sons (4/)	14/9	+1/-	5.3
68/9	50/-	Desoutter (5/)	53/6	...	3.1	15/3	11/1½	Solar Industries (5/)	11/1½	–1½d.	7.8
41/3	31/9	Dowty Group (10/)	33/-	+3d.	4.6	45/7½	25/1½	Staveley Industries (£1)	26/4½	+1/3	8.2
32/10½	22/4½	Edwards High Vacuum (4/)	29/6	+6d.	2.0	32/6	18/6	Steel & Co. (5/)	30/-	+1/1½	3.7
52/-	35/3	Elec. & Musical Ind. (10/)	36/3	+1/-	4.8	67/-	41/6	Stone-Platt Ind. (£1)	41/6	–1/3	...
38/-	25/9	Elliott-Automation (5/)	34/9	+7½d.	1.9	20/4½	14/-	Tecalemit (5/)	14/6	...	6.1
40/6	26/3	English Electric (£1)	29/-	+1/6	6.8	17/4½	12/6	Thompson, John (5/)	12/9	+3d.	1.9
37/3	23/-	Firth Cleveland (4/)	23/10½	+10½d.	5.3	7/-	4/9	Thornycroft, John (4/)	5/3	–1½d.	7.1
39/6	24/3	G.E.C. (£1)	26/6	+1/6	7.7	17/6	11/6	Toledo Woodhead (4/)	15/1½	+6d.	5.2
65/-	48/-	General Refractories (10/)	48/-	–9d.	5.1	85/6	55/-	Tube Investments (£1)	65/6	+7/-	4.3
66/6	50/7½	Glenfield & Kennedy (£1)	48/9	...	8.2	38/4½	25/9	Vickers (£1)	26/10½	+1/1½	7.4
108/7½	76/-	Guest, Keen & Nettlefold (£1)	80/6	+4/6	3.9	157/6	122/6	Walmsley (Bury) (£1)	127/6	–5/-	3.5
48/7½	26/6	Haden, G. N. (5/)	28/9	+1/9	3.3	84/6	64/6	Ward, Thos. W. (£1)	66/-	–1/-	4.1
16/6	12/1½	Hall-Thermotank (5/)	12/6	+1½d.	4.4	17/9	10/10½	Weir, G & J. (5/)	10/10½	–1/9	8.1
24/-	15/1½	Harland & Wolff (£1)	15/1½	–1/10½	6.4	47/6	28/4½	Wellman Smith Owen (5/)	29/6	+1/3	3.6
33/3	23/10½	Hawker Siddeley (£1)	23/10½	–2/7½	8.8	14/1½	10/1½	West, Allen (5/-)	10/3	+1½d.	6.5
31/-	19/9	Head Wrightson (5/)	20/-	+3d.	3.9	46/3	24/9	Westinghouse Brake (£1)	26/-	+1/3	8.3
79/9	51/6	Herbert, Alfred (£1)	61/6	+1/9	4.5	36/6	18/6	Whessoe (5/)	18/6	...	7.2
95/6	75/-	Hick Hargreaves (£1)	71/3	...	5.7	17/-	12/-	Wilmot-Breeden (5/)	14/-	+1½d.	4.0
138/9	101/3	Hopkinsons (£1)	110/-	–6/3	4.8	30/-	19/9	Woodall-Duckham (5/)	20/-	+3d.	5.1
25/-	18/6	Howden, James (5/)	19/9	–3d.	6.1	64/9	44/6	Worthington-Simpson (10/)	48/-	...	5.1
33/9	22/7½	International Combus (5/)	23/10½	+1/3	6.2						
		IRON AND STEEL									
13/6	25/7½	Brown Bayley (10/)	34/-	+9d.	4.6	42/-	23/4½	South Durham Steel (£1)	25/-	+1/7½	9.5
91/3	49/-	Colvilles (£1)	52/1½	+2/-	6.1	47/8½d.	32/4½	Steel Co. of Wales (£1)	34/1½	+4½d.	7.2
32/3	21/4½	Consett Iron (£1)	22/9	+1/4½	8.3	57/4½	40/1½	Stewarts & Lloyds (£1)	42/7½	+2/6	6.9
43/7½	25/4½	Dorman Long (£1)	26/1½	+9d.	7.5	68/7½	42/1½	John Summers (£1)	44/4½	+2/-	6.7
55/1½	37/6	Firth & Brown (£1)	40/-	+2/6	6.1	55/7½	38/-	United Steel Cos. (£1)	42/4½	+2/1½	5.7
49/10½	31/1½	Lancashire Steel (£1)	34/-	+2/6	6.4	63/6	46/-	Whitehead Iron & Steel (£1)	48/-	+2/-	6.1

The companies whose share prices are quoted in the Engineering table and which form the basis of the index give a balanced and comprehensive study of the engineering industry. Prices quoted are those at the start of the week. Due adjustments for Rights and Scrip issues are made. The Index figure is calculated on a National Cash Register Company computer. Prices in the Iron and Steel sections are not included in the Index.

Brisk rally subsides on dividend-cut report

SELECTIVE buying caused a brisk rally in industrial share prices in the early part of last week. The market continued to advance immediately after the Bank Rate change, but then turned easier on some discouraging company news, notably the decision by Courtaulds to cut its interim dividend.

The reduction in Bank Rate from 6½ per cent to 6 per cent was no great surprise in financial circles; in fact there had been hopes that the authorities would go further and cut the rate by a full 1 per cent.

Squeeze continues

Another lowering of Bank Rate is certainly a possibility, given the continued strength of sterling in the foreign exchange market. But having made two reductions within a month, the Chancellor and his advisers may decide to proceed cautiously until the general economic picture is clearer.

It has again been emphasised that in other respects the credit squeeze remains in force.

Since industry has to invest in order to keep in good competitive trim, we are likely to see a continued stream of capital issues, of one kind or another, by companies seeking to expand or modernise and finding bank facilities inadequate.

Some encouragement

Demand for share capital will no doubt exercise some restraint over share prices, as will recurring evidence of pressure on profit margins. As the results of Tube Investments have shown, however, not all company news is discouraging.

There had been fears that "Tubes" would return lower profits for 1960-61, but the gross figure is about £3 million higher at £27.2 million, a good result considering that both British Aluminium and Raleigh, now part of the TI group, earned less. The maintained 14 per cent dividend is three times covered.

Encouraging figures have also been announced by Samuel Osborn, which makes special steels, steel castings and engineers' tools, Pre-tax profits are up by nearly 30 per cent at £2,026,000, and the dividend is raised from 35 to 40 per cent.

The increase was all in the interim payment. The directors would have raised the final, but decided to hold the rate at last year's level of 25 per cent in deference to the Chancellor's appeal for restraint.

The 40 per cent total is covered about 3.3 times and Osborn shares give a yield of about 4 per cent.

Weak features

Among the weak features in markets last week were the shares of Hawker Siddeley, which dropped back by about 3s. on reports that the company had told staff representatives that the aircraft section was running into a slump because orders were drying up.

A steadier tone developed when the company denied that the labour situation was grave, but doubts about the future of the group's aircraft interests were not wholly dispelled. Other aircraft shares turned easier in sympathy.

WEEK IN THE CITY

BY OUR CITY EDITOR

CUT-COST DIESEL FOR WALES GAS BOARD

THE Wales Gas Board have bought a 693 b.h.p., 375 r.p.m. KLSS three-cylinder K-type diesel engine from Mirrlees, Bickerton and Day for their Shotton, Flintshire, station. The K-type driving a gas compressor, is the hundredth such engine, operating on heavy fuel, to be sold by the firm, a member of the Hawker Siddeley Industries group.

Useful savings can be made in costs by using heavy oil in place of relatively highly refined and expensive conventional diesel fuel.

The Mirrlees, Bickerton and Day technique depends on a combustion system of high efficiency plus preheating and centrifuging of the heavy fuel.

Waste heat used

Waste heat from the engine exhaust and cooling water is used, in addition to preheating the fuel oil, for raising boiler steam or hot water for space heating and factory processes, with substantial gains in overall thermal efficiency.

Similar installations to two Jordanian power stations being equipped with K type engines to run on surplus heavy oil are planned in other overseas countries.

The KLSS unit for Shotton will operate on 950 seconds viscosity fuel (Redwood No. 1 at 100 deg. F). K engines may be run on heavy fuels up to 3,500 seconds.

NEW Companies

Anglo-American Technical Services Ltd., Arundel Road, Luton. To carry on the business of design and consultant engineers in automation. Nominal capital £5,000.

P. Bairstow Ltd., 148 Hanson Lane, Halifax. To carry on the business of mechanical and general engineers. Nominal capital £1,000.

Crumlin Engineering Ltd., 97-100 Bute Street, Cardiff. To carry on the business of light and general engineers. Nominal capital £1,000.

N. P. Daisley Ltd., Works Road, Letchworth. To carry on the business of machinery and metal merchants. Nominal capital £3,000.

Energy Conversion Ltd. To carry on research work into the use and development of fuel cells and fuel cell systems and other sources of power. Nominal capital £200,000.

These particulars are selected from the daily Jordan's Register, published by Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2.

TEA BREAK!

Friendly but firm should be management motto

by J. HENDERSON, general secretary of the Institute of Industrial Supervisors

THE efforts of certain managements in industry to pare down the length of their workers' tea breaks is somewhat difficult to understand.

The shorter working week is not yet short enough to warrant any appreciable inroads into these minor privileges.

Most people going out to work face at least four and a half to five hours working time from the moment they start until their meal break. It seems unfair, at first glance, to refuse ten minutes or a quarter of an hour for a cup of tea.

Why do industrial managements want to cut down on the time for this refreshment? Ten to 15 minutes is about the minimum time required to have a hot drink in comfort. And it isn't so long ago when we were being told that the productivity curve went up after a break.

"'Ave a cuppa instant tea!"

Lost control

Naturally, there will be local conditions, peculiar to particular trades where it will be difficult to arrange a break.

There will be processes of a continuous nature where the tea will need to be taken on the job itself. But none of these problems have been raised in the current spate of tea break disputes.

A common feature of each dispute has been that the management has been proposing to reduce the time of the break or do away with it altogether. Why?

I believe that the answer is: they no longer have control of the situation.

There are few jobs in industry today where the worker has to be continually at it from the moment he starts till the moment he finishes.

Where the work is on a flow line basis which cannot be interrupted — for tea or anything else — there are usually relief operators or other special arrangements made.

The vast majority of jobs progress at a rate determined by the machines or material or the organisation of both these by the immediate management: the supervisors or foremen. And every supervisor knows that his workers need a break half way through the morning, and the afternoon.

Blind eye

Where management does not allow a break officially, supervision often allows one by default —by turning the now familiar blind eye.

The fact of the matter is that supervisors turn a blind eye to the innocuous human weaknesses of their workers because a convivial and congenial atmosphere of relationships in the workshop is vital if the work is to be done by men no longer disciplined by the dole queue.

Every supervisor tries to create the sort of give-and-take team spirit in his shop that will produce harmony — comparatively speaking.

But — and here's the rub — if he is not allowed to exercise his authority, or is not supported when he exercises his authority in checking the men — and there will always be some — who step out of line, abuse the privilege, or take advantage, then the situation will quickly deteriorate.

A ten minutes tea break scheduled for, say, ten o'clock in the morning, will eventually tot up to half-an-hour, or even 40 minutes off the job, for those men hell-bent on wringing the maximum out of every privilege.

They will leave the job at five to, ten minutes to, eventually a quarter to ten, to clean up and get ready for the break. They will drift back to the job at 25, even half past ten.

And what was a short break from the job which everyone could appreciate now becomes a dragged out work dodge in subtle defiance of a supervision powerless to take effective, immediate, remedial action.

When the situation reaches the proportions that even the management-at-a-remove can notice it, a decision is taken to whittle away or remove the privilege. The obvious time to take a slice out of a tea break is in the context of a wages settlement. And what is achieved by this "legislative" action? Precisely nothing.

Dungaree curtain

Management may feel they have won a victory, but it will be a dark victory.

The trade union representatives will be soured by the pettiness of the cut, the workers will once more be made painfully aware of the dungaree curtain between them and "the staff", and the column-dodgers will be confirmed in their determination to get away with as much — if not more — as they did before the tea break was cut.

Supervision has to be continually applied at a consistent level, day in, day out. It is useless to overlook a breaking or bending of a workshop rule today, and then hope to clamp down on it tomorrow.

The supervisor has to know, and his men have to know, just how far he is prepared to go in any given situation. He has to be fair and consistently fair, and seen by his men to be both. And his men need to "know where they stand".

Given these known terms of reference, peace will reign in the workshop community.

Until . . . ?

Until one man wants to go further than his supervisor is prepared to allow him. Brinkmanship isn't confined to the international scene.

In all human relationships there will be an interplay of this kind between the controlled and those in control, and quite often it is not fully realised that that is what, in fact, is taking place.

Brinkmanship

There will be, from time to time, an unconscious testing of "how far I can go" and "how much I can get away with." Man's evolution has depended on this quality of being prepared to have a go — to take a risk.

In the workshop situation this industrial brinkmanship makes it essential that management at all levels knows exactly what standards are to be applied, and what deviations can be tolerated.

The level of management most concerned with the direct application of standards of behaviour in the workshop is the supervisory level.

Is the supervisor too lax in industry today? Does he make insufficient use of his authority—the authority given him by the management to control his workshop?

Or has that authority been gradually undermined over the years? Has management failed to back up the supervisor when his authority has been tested by a worker attempting to "get away with" something that the supervisor wasn't prepared to "stand for"?

It has been a seller's market in labour for virtually the past 20 years. Some industries have suffered considerably through being unable to get sufficient men for their production programmes.

In such a situation it becomes expedient to turn a blind eye to the minor, the trivial breakings of rules. Tell the supervisor to go a bit easy on the men; after all, we want more men, not less.

Slowly, almost imperceptibly, the standards slip. The supervisor allows his men to "get away with" a little bit more because he knows that any disciplinary action he takes will be, at best, frowned on, or at worst, rescinded.

The answer

The minor relaxations that management felt flexible enough to allow as the price for peace gradually drift into a policy — not stated, of course — of peace at any price.

The answer is not easy. It is the sort of answer than a number of managements in British industry today seem incapable of providing because it requires time and effort consistently given for a comparatively long period of time.

And as we all know, some executives are so very busy, too busy with short-term expedients to embark on long-term policy. They want quick, shot-in-the-arm answers — gimmicks that will save them the bother of really tackling the problem.

The answer is that their supervisors must be men of sound personal qualities and high integrity, selected on these and their practical achievements, rather than on technical qualifications which would fit them for posts at other levels of management.

Their supervisors must be actively encouraged to gain as much insight into man's knowledge of industrial administration as is now available and what becomes available in the course of time. Their supervisors must be in on all decisions affecting the management of men and must be with, and take part in the formulating of, employee relations policy.

There is no once-for-all solution. Standards have to be continually maintained, and it is as easy to maintain a good standard as a bad one. The line has to be drawn somewhere to limit the extent of how far you are prepared to go, but once drawn it must be continuously enforced.

The odd five minutes here or the odd five minutes there might not seem worth upsetting harmony or risking trouble for, but this multiplied many times in the course of a couple of years or so might produce the sort of situation which requires strong, positive, even ruthless action, to retrieve.

Harmless?

And when the situation is supposedly retrieved, by management negotiating at top level with the trades unions, one can only wonder from the terms of the "settlement" exactly who is kidding who.

It is physically impossible for a worker to leave his job, wash his hands, queue up and be served with a cup of hot tea, drink it in reasonable comfort, and return to his job within the space of a negotiated five minutes tea break.

Both sides should consult frequently with their respective members — the supervisors and the workers — so that the relations between the two can be intelligently regulated to the ultimate benefit of the whole organisation.

$25m. LABORATORY DEDICATED

Multi-field steel research

RESEARCH laboratories, which cost 25 million dollars to build, have recently been dedicated by the Bethlehem Steel Co., Bethlehem, Pennsylvania. All research activities formerly scattered throughout the country are now concentrated at South Mountain in Bethlehem.

The laboratories are named after the Company chairman, Mr. A. B. Homer.

Since Bethlehem produces a wide range of steel products, the activities of these laboratories cover many technological fields including process metallurgy, chemical engineering, physical metallurgy, mechanical engineering, ceramics, physics, corrosion engineering, chemistry, mineralogy, electronics, mechanics, thermodynamics, and nuclear studies.

Complete heat treatment facilities with box furnaces in the physical metallurgy division covers the full heat-treatment temperature range for steel alloys.

Research here will involve not only bench-scale work in laboratories, but also pilot manufacturing plants.

The main building contains offices for research executives, engineers and the clerical staff, plus laboratories for five research divisions.

Instrumentation and control laboratories are equipped for the design, development and testing of instrumentation for mill controls. Equipment is primarily electrical and electronic instrumentation together with bench tools.

Other laboratories in this group are for the development of ultrasonic testing techniques, temperature measurement and non-destructive testing methods.

Six complete spectrographic laboratories each contain its own power supply and necessary auxiliary equipment. Included are prism and grating type spectrographs, which utilise photographic and direct reading methods of detection.

There is also an installation for work in the vacuum ultraviolet region and an X-ray fluorescence laboratory.

Major testing equipment, in addition to the usual hardness testing and sample preparation equipment, includes a 100,000lb universal testing machine, two 10,000lb tensile machines, a 30-ton drawing press, an impact machine and a high-speed rotating beam fatigue machine.

A creep test laboratory will accommodate ten machines and auxiliary recording instruments.

An X-ray diffractometer is used for identification of unknown compounds in crystalline material; auxiliaries are bench equipment for preparation and an X-ray film processing room. An electron microscope and auxiliary vacuum evaporation unit allows magnifications up to × 200,000 in metallurgical investigation.

An electron microprobe analyzer is used for quantitative analysis of minute volumes of material of the order of a cubic micron.

Internal friction apparatus and equipment for measuring electrical resistance are used in fundamental studies of metals to detect small amounts of carbon and nitrogen—to 0.0001 per cent—in solution in iron.

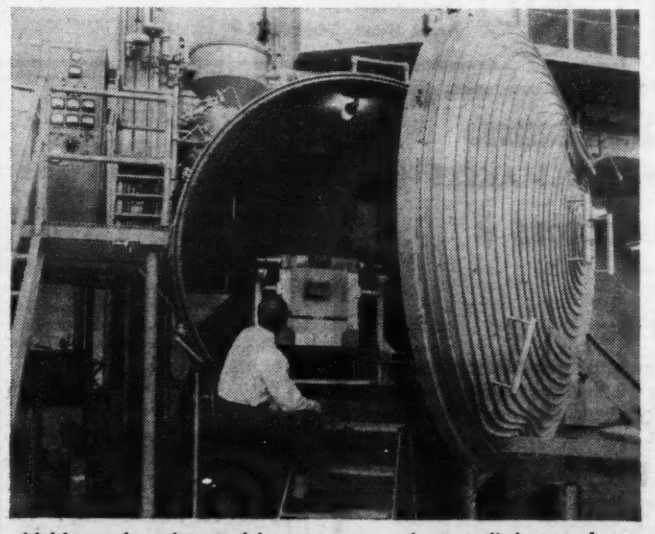
Also available is the usual grinding, polishing, and etching equipment for metallographic sample preparation.

Metallurgical microscopes permit examination of metal structures at up to × 2000. Other equipment produces black and white and colour photo-micrographs.

Installed in the gas-metal reaction laboratory are small atmosphere-controlled tube and box furnaces for elevated temperature studies, such as chromising, denitriding and decarburizing.

Facilities for metal preparation and enamel coating studies include bench-scale pickling and nickel flashing baths, a spray coating booth, a drying oven and firing furnace.

Necessary equipment to determine enamel adherence and resistance to fish-scaling are also available.



Melting and casting steel in a vacuum, or in controlled atmosphere, is accomplished in this apparatus, to produce super-clean steels.

ENGINEERING NEWS Appointments Service....

Engineering News Classified Advertisements

ADVERTISEMENT RATES

SEMI DISPLAY
£4 per single column inch

LINEAGE
7/6 per line

INSET LINEAGE
8/6 per line, minimum of 3 lines
(Box Number counts as one line)

BOX NUMBERS
When replying to Box Numbers address replies to Box ..... Engineering News, Drury House, Russell Street, London, W.C.2.

For Prompt Insertion WRITE:
Classified Manager
ENGINEERING NEWS
Drury House, Russell Street
London, W.C.2

or TELEPHONE
LONDON: Temple Bar 3422
BIRMINGHAM: Midland 5786
MANCHESTER: Central 9935
GLASGOW: City 3492

PUBLIC AND COMMERCIAL APPOINTMENTS

BRIGHTON EDUCATION COMMITTEE
BRIGHTON TECHNICAL COLLEGE
Principal: G. E. WATTS
C.B.E., M.A., Ph.D.(Cantab)
B.Sc.(London), F.R.I.C.

Required for January 1st, 1962:

LECTURER IN ELECTRICAL ENGINEERING to teach to final degree and diploma standards. Ability to offer a specialist subject an advantage. Degree, or corporate membership of professional institution, plus teaching experience required.
Salary £1,370 by £35(4) plus £40 to £1,550 (under review). Increments may be allowed in this scale for approved experience.
Further particulars and forms of application from the undersigned to be returned to the Principal, Brighton Technical College, Richmond Terrace, Brighton 7, not later than November 21st, 1961.

W. G. STONE
Director of Education
54 Old Steine,
Brighton

ENGINEERING DRAUGHTSMAN: ROYAL MINT. Post in London for man or woman aged 20 or over, with O.N.C. in Mechanical Engineering (or equivalent qualification), at least 3 years' practical training or apprenticeship, and at least one year's full-time drawing office experience, preferably on general duties associated with services, maintenance and production. Starting salary from £617 (at 20) to £960 (at 28 or over): scale maximum £1,048. Write stating age, qualifications and experience, to Establishment Officer, Royal Mint, London, E.C.3. Closing date December 1st.

EXPERIENCED DRAUGHTSMAN not under 25 years, required by machine toolmakers in their gear machine section. Minimum requirements O.N.C. level and general engineering apprenticeship. Good conditions including Staff bonus and three weeks annual holiday. Confidential applications to the Personnel Manager, DRUMMOND BROTHERS LIMITED, Post Box 4, Rydes Hill, Guildford.

PRODUCTION PLANNING ENGINEER required to assist in planning and development of new mechanical projects. Applicant should have knowledge of press tooling and small mechanism assembly. Engineering certificates essential. — Write in first instance to Ref. 245, Personnel Manager, RONSON PRODUCTS LTD., Leatherhead, Surrey.

ENGINEERS
required by Gwynnes Pumps Ltd. in their London Office to prepare tenders and specifications for pumping plant. Apply in writing, giving full details, to 62 Chancellors Road, Hammersmith, W.6.

PROJECT DESIGNER ENGINEER
required for initial heat transfer calculations on all types of medium size heat exchangers. No age limit. Previous experience an advantage but not essential providing applicant has good technical qualifications. Apply in writing, giving full details, to Chief Engineer, DELANEY GALLAY LTD., Vulcan Works, Edgware Road, Cricklewood, N.W.2. GLA 2201.

YOUNG SALESMAN for European Market
Well-known Paris Company require a young and ambitious Salesman of proved ability to expand sales of their well-known world-patented hydraulic machines. Some knowledge of Engineering practice desirable but not essential. Only those capable of earning £1,000 p.a. plus should apply. Company car and full expenses. Usual personal details to
Box No. E.N. 104

LOUGHBOROUGH COLLEGE OF TECHNOLOGY
Leicestershire

APPLICATIONS ARE INVITED FOR LECTURESHIPS IN THE DEPARTMENT OF MECHANICAL ENGINEERING

Applicants should have had industrial, research or teaching experience and, preferably, should possess a University Degree or Diploma in Technology. Encouragement will be given to develop research interests and to work for higher academic qualifications.

Particular fields of interest include engineering design, hydraulic and pneumatic systems and dynamics of machinery.

Salary scale (currently under review) £1,370 to £1,550 per annum. The commencing salaries will be determined by previous experience and qualifications and the posts are pensionable.

Application forms and further information may be obtained from the Academic Registrar. (In reply please quote ref. 27/2/BR.)

ELECTROFLO METERS CO. LTD.
(Members of the Elliott-Automation Group)

Applications are invited for the following appointments:—

SENIOR DESIGN DRAUGHTSMAN
having several years design experience in light engineering, preferably concerned with Industrial instrumentation, with a strong background of Production Engineering. H.N.C. or equivalent. Will work in a team engaged on project design of instruments in an expanding industry. Salary negotiable.

ELECTRICAL—ELECTRONIC DEVELOPMENT ENGINEER
with some years practical experience particularly in designing transistor circuitry. Minimum qualification H.N.C. or equivalent. Salary up to £1,100. Will be engaged in the design of new electronic instruments and control schemes.

CONTRACT ENGINEERS
with knowledge of the Plant used in any of the following industries: (a) Paper (b) Oil and/or Chemical (c) Water Works or (d) Industrial Boilers. Experience in Instrumentation desirable but not essential. Minimum qualifications O.N.C. or equivalent and ability to conduct technical correspondence.

INSTRUMENT TECHNICIAN
for prototype testing of electro-mechanical instruments and Test Gear. Qualifications O.N.C. or appropriate City & Guilds Certificate.
Posts are pensionable with free life assurance.
Apply to **R. G. Jones, ELECTROFLO METERS CO. LTD., Abbey Road, N.W.10. Telephone: ELGar 7641.**

THE BRITISH OXYGEN CO. LTD.

WORK STUDY ENGINEERS

The British Oxygen Co. Ltd. Engineering Division invite applications from qualified Work Study Engineers to carry out basic planning and to organise the implementation of a wide range of projects covering the following fields:

(a) Factory Layout and Site Development
(b) Stores and Materials Handling
(c) Process Engineering
(d) Special Investigations

These posts will be of interest to experienced engineers who are qualified to at least H.N.C. standard.

These posts carry progressive salaries and attractive conditions of service. Written applications giving full details of career to date should be addressed to:

Recruitment and Training Officer (EN/L1852)
The British Oxygen Co. Ltd.
(Engineering Division)
Angel Road, Edmonton, N.18

PROCESS PLANNING ENGINEER required to assist in preparation and maintenance of manufacturing layouts. Engineering certificates desirous. — Write in first instance to Ref. 246, Personnel Manager, RONSON PRODUCTS LTD., Leatherhead, Surrey.

DOMESTIC ELECTRICAL APPLIANCE MANUFACTURERS
require :

(1) SENIOR DRAUGHTSMEN
For design and layout of appliances. Some press-tool design and electrical knowledge an advantage.

(2) JUNIOR DRAUGHTSMEN

(3) TOOL ROOM FOREMAN
with experience in press-tools.

(4) ASSEMBLY SHOP FOREMAN
experienced with some electrical knowledge.

The positions offered are permanent and progressive with good salaries based on experience and qualifications.

Write or phone:
APSLEY METAL PRODUCTS, 115-129 Carlton Vale, LONDON, N.W.6
Maida Vale 0626

YOU WANT A PREMIER STAFF POSITION!!

324 HIGHLY SKILLED PRECISION SPECIALIST REQUIRED

*** JIGBORERS * UNIVERSAL MILLERS * TOOLMAKERS * (2-Shift System)**
*** CENTRE LATHE TURNERS * A.I.D. INSPECTORS ***
*** SENIOR ESTIMATING ENGINEERS ***
*** SENIOR PLANNING ENGINEERS ***
*** SENIOR METHODS/STUDY ENGINEERS ***

Skilled Engineers with experience in accurate assessment of machining times and processing of small and large batch production of high-precision components and assemblies. At least five years high-precision experience essential. Pension and Life Insurance Scheme.

PREMIER PRECISION LTD., WESTERN RD., BRACKNELL
Design, Research and Development Engineers Phone: Bracknell 2222

House Purchase Facilities Available

HYMATIC
DESIGNERS
This medium sized Worcestershire Company is making a further increase to its design staff and requires two designers for interesting work in new projects.
Many of our projects are concerned with pneumatic controls and precision light engineering in the aircraft and missile fields, and applicants should preferably have experience in similar work, an ingenious mind, and H.N.C. or equivalent.
The Company offers good salaries, excellent prospects and first-class pension schemes.
There are also vacancies for TECHNICAL ASSISTANTS of at least O.N.C. standard.
Please apply to:
The Technical Manager
The Hymatic Engineering Co. Ltd.
Redditch, Worcestershire

CONTRACTS SUPERVISOR
BAHRAIN

The Bahrain Petroleum Company Limited invites applications for a position in their Engineering and Construction Department for men possessing a Higher National Certificate in Civil or Mechanical Engineering and at least five years' experience in oil refinery or similar construction or maintenance work with responsibility for works planning or supervision.

Applicants, who should be under 35, should have a comprehensive knowledge of contracts administration, construction techniques, tools and materials, engineering principles applied to construction and maintenance work, job and man power planning and scheduling cost, quality and production control.

A good commencing salary can be offered in accordance with qualifications and experience, in addition to which free air-conditioned accommodation and a living allowance are provided. An initial kit allowance, medical attention, paid home and local leaves are also provided with passage paid for the former and generous assistance towards the fare for the latter.

Apply in writing with full particulars to:

CALTEX SERVICES LIMITED
CALTEX HOUSE
KNIGHTSBRIDGE GREEN
LONDON, S.W.1

Quoting Reference CS.

The Good Mechanical Engineer

The Experimental Engineering Group of British Nylon Spinners Limited undertakes a great many light engineering projects of an immense variety, for use in scientific and engineering research and production. Nearly all of these necessitate original design. Each Experimental Engineer is responsible for steering his projects from their first inception to production.
The Engineers who work in this Group gain a great breadth of engineering knowledge because of the somewhat unusual opportunities for discussion with the scientific research staff. They also obtain a knowledge of the engineering problems in a process industry for which many traditional engineering firms make the machinery. This work will include combinations of mechanical and electronic systems in relation to servo theory; machine, fluid and thermodynamics; strength of materials, often involving analogue simulations. The work may, also, incorporate optical and magnetic devices. We do not expect our engineers to be experts in all these subjects.
We now wish to fill two vacancies and we should like to interview engineers from 21 to 33 years, who have either a degree in Mechanical Engineering or who have obtained Membership of the Institution of Mechanical Engineers.
The Company pursues an active policy of filling more senior appointments from within. All members of the staff are encouraged to take up posts in other parts of the organisation in order to develop their full potential.
The Company, also, actively encourages engineering staff to discuss their problems with senior university members who are the Company's consultants in their particular fields.
The Works lie in one of the most attractive valleys in Monmouthshire, within easy reach of towns. Rented housing is available at reasonably short notice, for which married men moving into the area obtain priority. Profit sharing and contributory pension schemes operate. Assistance is given with removal and other expenses.
Applications, quoting E.113, should be addressed to the Personnel Manager,

British Nylon Spinners Limited
PONTYPOOL, MONMOUTHSHIRE

APPOINTMENTS SERVICE

Continued from page 18

BBC

SENIOR ENGINEER
required for
DESIGNS DEPARTMENT
based in London

Responsibilities include the mechanical development of equipment used for sound and picture recording in the sound and television services and advising on mechanical problems arising in a wide range of other equipment used in a broadcasting service.

The candidate must be able to work on his own initiative with a minimum of supervision and the post offers excellent opportunities for original thought and the development of new ideas.

Experience in the design, development or construction of light mechanisms is necessary and a general knowledge of audio frequency electronics is desirable. An acquaintance with film techniques and with the equipment used for sound recording on tape would be an advantage.

Applicants (British subjects) should have a degree or an equivalent professional qualification in mechanical engineering, but a record of successful work in the development of light mechanisms would be an acceptable alternative. The salary offered will be according to qualifications and experience, in a range with a maximum of £2,225 p.a. but a higher maximum would be offered for exceptional qualifications and experience.

Please write for application form to Engineering Recruitment Officer, Broadcasting House, London, W.1. quoting ref. 61.E.240 ENG. N.

Ferranti

LIMITED

require a

senior production techniques engineer

to develop automatic production methods applicable to electronic components.

Applicants should possess a degree in mechanical engineering and must have had several years' experience in automatic production techniques and in the design of small mechanisms.

This post demands initiative and there is considerable scope for inventive ability.

A substantial progressive salary will be paid.

The Company operates contributory dependants' insurance benefit and staff pension schemes incorporating generous life assurance cover.

Please apply in writing to the **Personnel Supervisor, King's Cross Road, Dundee.**

THE WORLD TURNS ON COLCHESTER LATHES

Further expansion of our world markets creates a vacancy for an

Assistant to the CHIEF DESIGNER

to work on ambitious new projects.

The man we are looking for will hold H.N.C. and will be aged about 30. He will preferably have experience of machine tool design and layout; and ability to work on his own initiative will be essential. An attractive salary will be paid, and a pension scheme is operated.

●

Apply to The Works Director:

THE COLCHESTER LATHE CO. LTD.

HYTHE · COLCHESTER

Engineering News WORKS SERVICES...

TRADE SERVICES

PRECISION ENGRAVING

A.I.D and A.R.B. approved

LEICESTER ENGRAVERS (PLASTICS) LTD.
60 Edwyn Street, Leicester
Phone 58378

CIRCLIPS

all types from stock

ELLISON SPRING CLIPS LTD
BINGLEY, YORKS
Tel CULLINGWORTH 8836/7

DESIGN AND DETAIL DRAUGHTING

Mechanical, Electrical, Jig/Tool, Machinery, Electronics, Plant, etc.

Specialist Engineers and Draughtsmen available in our Manchester and Birmingham Offices. Also Draughtsmen available to work in Clients' Offices.

BIRMAN ENG. ASSOC. LTD.
Cromwell Buildings, Blackfriars Street, Manchester.
Tel. Blackfriars 0758

Keen quotes, early delivery. Press Tools, Centre Lathe Turning, General Machining and Grinding. Dies, Moulds, Jigs, Form Gauges. Die Castings, Medium Presswork.

HAUSER JIG BORING
HAUSER JIG GRINDING 3.S.M.
Inquiries invited. Write
GEO. MOORHOUSE ENGINEERS
14 Pedders Lane, Blackpool, Lancs
Tel. Blackpool 41395

MILTON ENGINEERING CO. LTD.

126 Clarendon Road
HYDE, Cheshire
Tele. HYDE 2091/1316

Fabricators and stockists of Perspex Signs, Machine Guards, Moulding and Blowing of Domes, Self-Service Shops, General Display work, Advertising Specialities, Machine Engraving. Now is the time to order your 'give away' items for Christmas. Rulers, Letter Openers, Desk Jotters, etc. Printed to your own requirements. Your enquiries invited. Quotations by return.

APPOINTMENTS (Cont.)

MORGAN REFRACTORIES LIMITED

invite applications for the post of

PRODUCTION ENGINEER (TOOLS)

An experienced Engineer is required for this important position in the Production Engineering Department.
It is not expected that an Engineer who is less than 30 years of age will have the experience required, since the post entails full responsibility for design and provision of all tools and dies used by the Company. Academic qualifications will be secondary to experience in the desired field.

Apply with full details to:
The Personnel Manager,
MORGAN REFRACTORIES LIMITED
NESTON, WIRRAL, CHESHIRE
(A Member of the Morgan Crucible Group)

PROCON (GREAT BRITAIN) LTD.

Due to further expansion and modified organisation, we require the following permanent additions to our drawing office staff:

PIPING LAYOUT MEN
PIPING CHECKERS
SNR. PIPING DRAUGHTSMEN
PIPING DRAUGHTSMEN
PIPING STRESS TECHNICIAN

Commensurate salaries based on experience in the above categories will be paid to me with Petrochemical and Oil Refinery experience in detail draughting, A.S.A. and D.I.N. Standards.
The Company operates a five-day week, Pension Scheme, Free Life Assurance and Luncheon Vouchers.
Apply stating salary required to:

Personnel Department
PROCON (G.B.) LTD.
Ref. 54, BUSH HOUSE
ALDWYCH, W.C.2

CAPACITY AVAILABLE

ELECTRICAL COILS and Coil-Winding Capacity. Deliveries reliable. Inquiries welcomed. LOWDONS, Temple Works, Tay Street, Dundee (22314).

AUTOMATIC CAPACITY, multi and single spindle up to 1½" dia. Keen prices, high quality. MAPPERLEY ENGINEERS LTD., Haywood Road, Mapperley, Nottingham. Tel 63884.

ENGINEERING WORKS, S.W. London, has assembly and machining capacity available. Capstans, Centre lathes, Grinders, Millers, Shapers. — Box W.S.99.

IMMEDIATE CAPACITY AVAILABLE
Heavy and Light Sheet Metal Work, Welded Fabrications, Press Work up to 75 tons, Milling, Turning and General Machine Shop Work also Spray Painting and Dipping. Send enquiries to:
C.P.E. LTD., High Street
Cranleigh, Surrey
Tel Cran 911/2

Immediate Capacity Available!
Pressure Vessel Specialists and Structural Engineers. Lloyds Class II and Admiralty Grade 'A' approved.
The Rochester Welding & Engineering Co. Ltd.
Bath Hard Lane, Rochester, Kent
Chatham 43476

TWW
WANTED
Modern Used
MACHINE TOOLS
SHEET METAL MACHINERY
COMPRESSORS & PUMPS
HYDRAULIC PLANT
FOUNDRY PLANT
POWER PLANT & ELECTRIC MOTORS, etc.
Prompt inspection
Thos. W. Ward LTD.
Albion Works, Sheffield
Phone 26311
Brettenham House
Lancaster Place, W.C.2
Phone TEMple Bar 1515
Fore Street, Glasgow, W.4
Phone Scotstoun 6355
Giants Wharf, Briton Ferry
Phone 3166/7
Member of B.A.M.I.M.)

MACHINERY FOR SALE

LONGFORD MACHINE TOOL CO. LTD.

offers a selection from stock:

PROGRESSIVE Centre Lathe	£625
COVENTRY TOOL & GAUGE Thread Grinder	£1,850
PARKSON Universal Milling Machine	£850
KEARNS No. 2 Boring Machine	£2,500
HERBERT No. 3 Chucking Auto	£325
HEAD WRIGHTSON 11ft. x ¼in. Guillotine	£2,400
HERBERT 18B. Horizontal Mill	£850
REED PRENTICE No. 5 Vertical Mill	£1,250
B.S.A. Chucking Automatic	£480
BARBER & COLEMAN Hobbing Machine	£420
EDGWICK Plain Milling Machine	£430
COVENTRY Tool and Gauge Thread Grinder	£850

LONGFORD ROAD, COVENTRY. Tel. Cov. 87481

CAPACITY AVAILABLE

CENTRELESS Grinding Capacity available up to 9/16in. diameter. Attractive prices and quick deliveries.—ISAAC JACKSON & SONS (Fasteners) LTD., Glossop. Tel. 2091.

MATERIAL HANDLING AND STORAGE EQUIPMENT
We design and manufacture at competitive rates all kinds of PALLETS, MOBILE BASES, STORAGE RACKS AND FREE-STANDING MEZZANINES, ETC. We should be more than pleased to advise and quote without obligation.
B. E. F. ENGINEERS LTD.
Material Handling Engineers
Platt Street Works, Bolton
Tel. Bolton 25952

CONTRACT DESIGN SERVICE

in addition to their normal manufacturing facilities

WALTERS & DOBSON LTD.

can now offer a contract design service at attractive rates for the design and detail of the following

PRESS TOOLS
JIGS AND FIXTURES
AUTOMATIC CAM LAY-OUTS AND TOOLING
SPECIAL PURPOSE MACHINE TOOLS

All enquiries for PROMPT SERVICE and estimates should be addressed to the Head Office of
WALTERS AND DOBSON LTD.
BAILEY ST., SHEFFIELD, 1

SPECIAL SELECTIONS FROM OUR EXTENSIVE STOCKS OF MACHINE TOOLS

Cincinnati No. 1-18 Plain Automatic Milling Machine, Model EA. Speed range 50 to 1,500 r.p.m. Feed range 1in. to 24in. per min. Complete with all pick-off gears and standard equipment. Serial No. 0.5703-14. 1959. In first-class condition.

Ward No. 7 Capstan. Chucking Machine, Speed range 27 to 750 r.p.m. Power feeds to saddle and turret. Some turret tooling.

Ward 2A Capstan. Air-operated collet chuck. Bar feed. Two-speed motor giving speed range 48 to 2,040 r.p.m. Power feed to turret. Elec. Coolant. Quantity of collets.

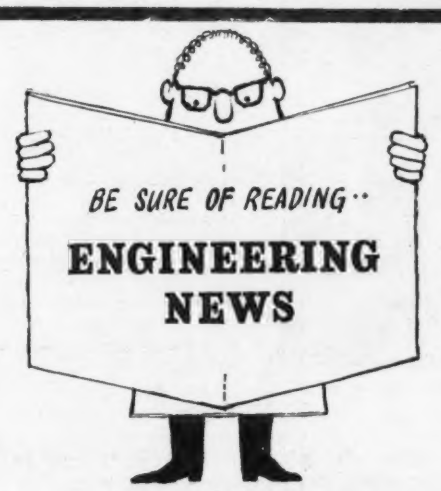
All machines motorised 415/3/50.

We invite your inquiries for all types of Machine Tools. Extensive range of machines ex stock.

A. LAWRENCE & CO. (MACHINE TOOLS) LIMITED
Welsh Harp, Edgware Road, London, N.W.2
Telephone: GLAdstone 0033
Telex: Rockmax London 22781

FOR SALE

ABOUT AMMUNITION BOXES
THOUSANDS OF STEEL AND WOODEN BOXES OF ALL SIZES
Ideal for all Types of Packing and Storage purposes
For particulars and prices apply:—
O.K. TRADING (Bham Factors) LTD.
78-84 MOAT LANE, B'HAM 26
STechford 4351/2 P.B.X.



EVERY THURSDAY 4D. from your newsagent

Please hand a coupon to your newsagent TODAY

Please reserve/deliver me a copy of ENGINEERING NEWS every Thursday, price 4d.

NAME : .....
Block Capitals, please
ADDRESS : .....
.....

Published and distributed by Heywood & Company Ltd., Carlton House, 66-69 Gt. Queen St., London, W.C.2

EN 5

Please reserve/deliver me a copy of ENGINEERING NEWS every Thursday, price 4d.

NAME : .....
Block Capitals, please
ADDRESS : .....
.....

Published and distributed by Heywood & Company Ltd., Carlton House, 66-69 Gt. Queen St., London, W.C.2

EN 5

Please reserve/deliver me a copy of ENGINEERING NEWS every Thursday, price 4d.

NAME : .....
Block Capitals, please
ADDRESS : .....
.....

Published and distributed by Heywood & Company Ltd., Carlton House, 66-69 Gt. Queen St., London, W.C.2

EN 5

Sir Harry tells how the DSIR pays off

EXTENSIVE improvements and savings effected by research sponsored by the Department of Scientific and Industrial Research were detailed by Sir Harry Melville, F.R.S., to the Manchester Statistical Society last night

Sir Harry, who has been secretary of the Committee of the Privy Council for Scientific and Industrial Research since 1956, said that over the past 20 years there had been a ten-fold improvement in the dimensional-accuracy of large marine gears in which both the National Physical and the National Engineering Laboratories had played an essential

Machine tools such as gear-hobbing machines and screw-cutting lathes normally pass on to their products the small, but unavoidable, dimensional inaccuracies in their mechanical drives.

The NEL, starting from basic work at the NPL, has developed a technique for measuring the effects of these errors as they occur and for reducing them.

Another development of importance potentially in machine tools was taking place at the NEL.

This was the development of hydrostatic transmissions, in which power or movement was transmitted by changes in fluid pressure.

The particular advantages over electrical transmission were smaller weight and volume of equipment and very quick reversing.

One of the most striking economies achieved had been an estimated £300 million saved on school building over the last 12 years

The work of the Ship Division had led to savings in fuel costs due to improvements in hull forms of almost £3 million in 20 years.

LATE NEWS

TEMple Bar 3422

The Admiralty announce Hovercraft trials unit to be set up at Lee-on-Solent to assess Hovercraft for military purposes. Possible uses are anti-submarine operations, air-sea rescue, amphibious warfare, mine hunting and coastal forces duties.

Europe votes at satellite conference in London

FOUND—A USE FOR BLUE STREAK!

Britain to provide first stage of space probe

BLUE STREAK, the de Havilland rocket, is to be adopted as the first stage of a European satellite launching vehicle. This was decided at a conference held in London last week, with delegates from Great Britain, France, Australia, Belgium, Denmark, the Netherlands, the Federal Republic of Germany, Italy, and Spain.

A final draft convention has been prepared for the consideration of governments.

A French rocket will be used as the second stage, and the third stage will be developed under the leadership of the Federal Republic of Germany. The organisation that is planned will also develop, as part of the initial programme, a series of satellite test vehicles to prove the launcher system.

The programme provides for the first firing of the complete three-stage rocket to take place from Woomera in the summer of 1965. An attempt will be made in this trial to place a satellite test vehicle in orbit.

Blue Streak is basically a 10ft. diameter by 60ft. long cylinder. With fuel, it weighs about 90 tons.

Two engines

The propulsion bay contains two Rolls-Royce rocket engines capable of giving a combined thrust of well over 300,000 lb.

They are pivoted on their mountings and, by gimballing, the vehicle can be controlled in yaw, pitch and roll.

Above this is the tank with separate storage for 60 tons of liquid oxygen and 26 tons of kerosene.

On firing, the 100-ton three-stage vehicle would rise vertically for 20 secs. climbing steadily to about 2,000 ft. It would then begin to turn over slowly until the desired trajectory angle, about 30 degrees to the horizontal, is reached.

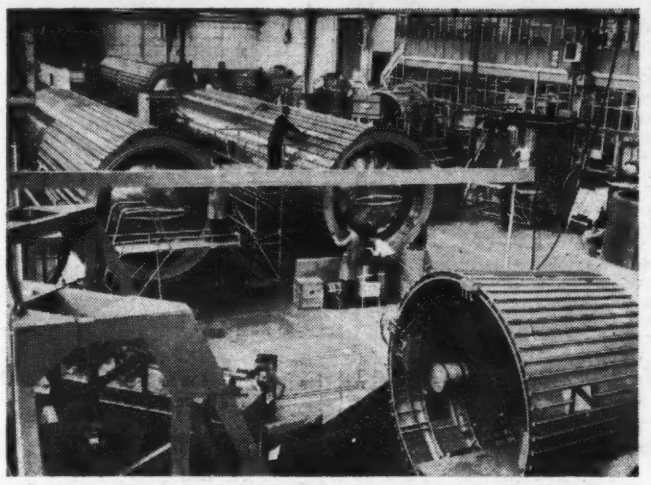
The vehicle's speed at this stage would be 2,500 m.p.h. and its height nearly 18 miles. Blue Streak would then accelerate up a straight climb path until its speed reached 8,500 m.p.h.

The calculated time from launching to burn out of the first stage would be about 160 secs., and the rocket would be 50 miles high and 80 miles from the launching site.

Contract work

Work on the satellite launching vehicle will be carried out by means of contracts placed either by the organisation itself or by the governments of member states on its behalf.

Information acquired during the work will be freely exchanged by member states.



Blue Streak rocket vehicles being assembled at the de Havilland factory at Stevenage.

Plastic for protection

Polished sheets covered with Selloshield protective paper mask pass along a slatted conveyor.

A new method for protecting polished stainless steel with a covering of p.v.c. or latex backed paper has been developed by Firth-Vickers Stainless Steels.

Previously, sheets despatched to customers have been separated by tissue paper or cellulose wadding. But this left no protection after unpacking, hence the idea of an adhesive film.

Both the paper and pvc tapes need to be stripped before any pressing operation and efforts are being made to find a thin adhesive film with the plasticity of polythene and the protective qualities of p.v.c.

Dial-face control

AN optical digitiser and decoder, which will translate visual readings on instruments into digital form for operating controls and producing records, is being made by Lindars Automation Ltd., 143 Maple Road, Surbiton, Surrey.

The digitiser unit has an amplifier and a drum containing twelve coded tracks with photo cells .

The decoder unit receives signals from the digitiser in coded form and translates them by relays into three decades 0-9.

Sheffield exhibition

THE 1961 Sheffield Foundry Exhibition was opened on Tuesday at the Somme Barracks, Glossop Road. The exhibition is sponsored by the Sheffield and District Foundry Trade Technical Society in conjunction with the Sheffield branch of the Institute of British Foundrymen.

Open until November 10, the exhibition contains stands covering a wide range of exhibits.

10 TIMES THE SPEED OF ATLAS

AN electronic computer which will be able to make 10 million calculations a second is envisaged by Professor Tom Kilburn, head of the computer engineering department of Manchester University.

"A computer of this kind will probably be built within the next ten years, but, of course, there are limits to speeds which can be achieved beyond that because you cannot go faster than the velocity of light," Professor Kilburn told Engineering News shortly after his return from Moscow where he lectured on the "Atlas" computer which has been developed by Manchester University and Ferranti Ltd.

He added: "The cost of Atlas, which is now being assembled here, will be twenty times the cost of 'Mercury' our present computer, but as it will do 200 times as much work it will be ten times cheaper to work out problems."

TUC SEEK MORE SAFETY VISITS

A DEPUTATION from the Trade Union Congress received last Monday by the Minister of Labour, Mr. John Hare, stressed the need for an increase in the number of H.M. Factory Inspectors.

The T.U.C. representatives expressed their concern at the rise in the number of industrial accidents in 1960.

They referred to the increase in the work-load of the Factory Inspectorate over the last 30 years, repeated their view that the increase in the establishment following the 1956 White Paper was inadequate, and argued the need for workplaces to be inspected more frequently.

In view of these factors, they urged that there should now be a substantial increase in the size of the Inspectorate.

In Britain, a factory is visited at least once in four years at present.

● from front page

'Pencil' plug

capacity main bearings and a torsional damper at the nose of the crank are fitted to cater for the higher stresses of the high-speed compression unit.

The fuel injection equipment is in the form of the latest distributor type D.P.A. pump. Other than these changes the 1.5 diesel is of similar shape and appearance to its petrol equivalent and of identical overall dimensions. It weighs only 50lb. more.

The "pencil" plug incorporated in the engine has been produced by K.L.G. Sparking Plugs in conjunction with AEI.

It has a sheathed element, replacing that of the conventional exposed coil.

Small fitting

With a "working end" diameter of only ¼in. compared with approximately ⅜in. diameter of the usual exposed coil plug, the new sheathed element heater needs a correspondingly smaller entrance hole into the pre-combustion chamber.

This permits larger coolant passages around the pre-combustion chamber, and at the same time reduces lost compression effect with improved power.

The sheath of Inconel—a nickel alloy resistant to corrosion at high temperatures—is not only a safeguard against mechanical damage but protects the heated element from combustion gasses.

Current consumption is reduced to less than half that of the conventional exposed coil plugs. The sheathed element plugs are connected in parallel to the battery and if one becomes unserviceable the others will continue to function.

NO COAL-SACKS TO COUNT

The new coal tanker, which costs about £4,000, can deliver coal at the rate of a ton every three minutes.

A NEW era in coal delivery began last week when a coal man wearing a white coat delivered coal by hosepipe to a public house, "The Leicestershire Yeoman" in Leicester.

It was the first time in Britain that coal was delivered by pipeline from a newly developed vehicle inspired by a lorry supplying cattle feed.

Equipment on the vehicles has been developed by Spencer of Melksham (Wilts.) and Dunns Motors of Taunton (Somerset).

An official of the East Midlands Division of the National Coal Board who carried out the development experiments, revealed to Engineering News "Technicians at our central machinery depot spotted a lorry being used to pipe cattle food into farmers silos and decided that the idea had possibilities.

"They managed to borrow a lorry, filled it up with coal and found that it worked perfectly. The compressed air supply was strong enough to shoot a stream of coal 24ft. vertically into the air."

Published and distributed by the proprietors, Heywood & Co. Ltd., Drury House, Russell Street, London, W.C.2. (Circulation Dept., Carlton House, 66/9 Great Queen Street, W.C.2.) TEM 3422.
Printed in England by Q.B. Ltd., Newspaper Printers, Sheepen Road, Colchester, Essex. Registered at the G.P.O. as a newspaper. Price 4d. Every Thursday, November 9, 1961. © Heywood & Co. Ltd, 1961.